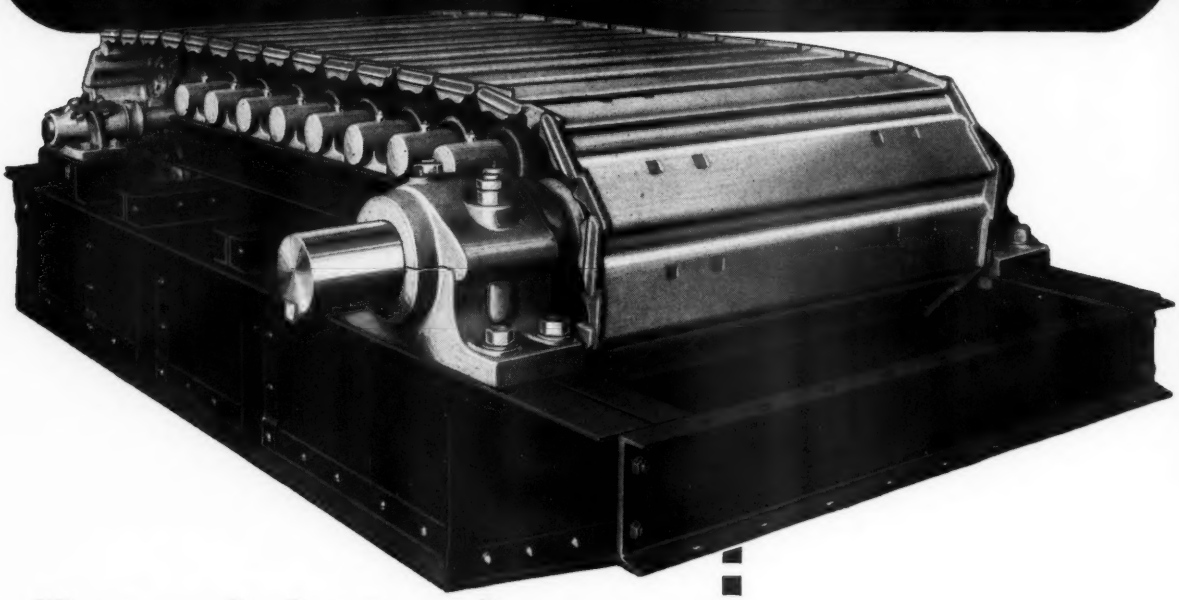
Mining

CONGRESS JOURNAL

NOVEMBER
1949

LINK-BELT Heavy-Duty Apron Feeders



Unusual design features cut ore feeding costs

Link-Belt heavy-duty apron feeders have a number of exclusive features that increase durability and cut costs.

The heavy-duty design shown above is used for handling minerals containing lumps in size from ¼ inch and smaller up to 6 feet.

Sprockets, chains, rollers and overlapping (non-sagging) apron pans are made of manganese or cast steel. The chains on the loaded run are adequately supported on rugged rollers which are independently mounted on heavy shafts turning in closed end bearings. These rollers are located under the apron in protective positions and eliminate exposure to destructive materials.

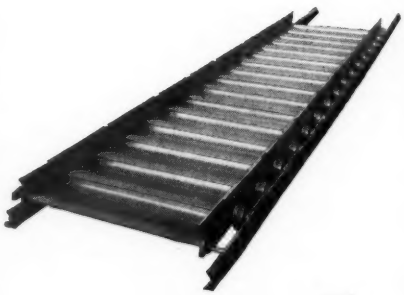
For detailed description and range of sizes, write for Folder No. 1551 or get in touch with our nearest office.

LINK-BELT

CONVEYORS, MATERIALS HANDLING, PREPARATION AND POWER TRANSMISSION MACHINERY

Other LINK-BELT types of feeders and conveyors

Link-Belt builds apron feeders and conveyors in a range of sizes and a variety of types to suit numerous applications.

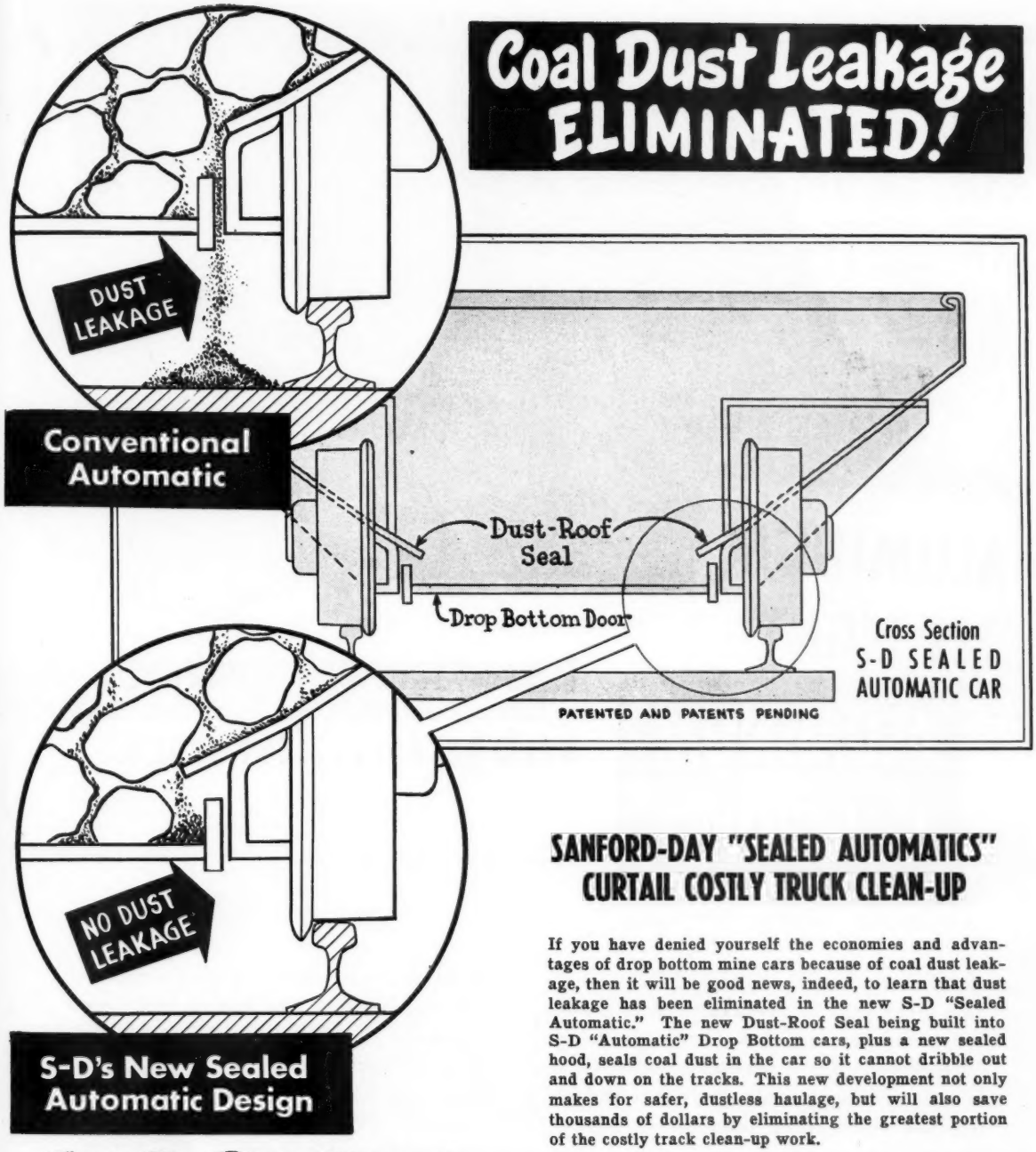


11.225

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.
Offices in Principal Cities.

Coal Dust Leakage ELIMINATED!



Above is a diagram that shows how you can keep dust off your tracks with the S-D "Sealed Automatic." In the circle at top left is shown the conventional drop bottom construction and how dust shakes down and out through the necessary clearance space between the door and the car frame. The lower circle shows how the new Dust-Roof Seal carries sifting dust across the open space, providing a 100% effective dust seal.

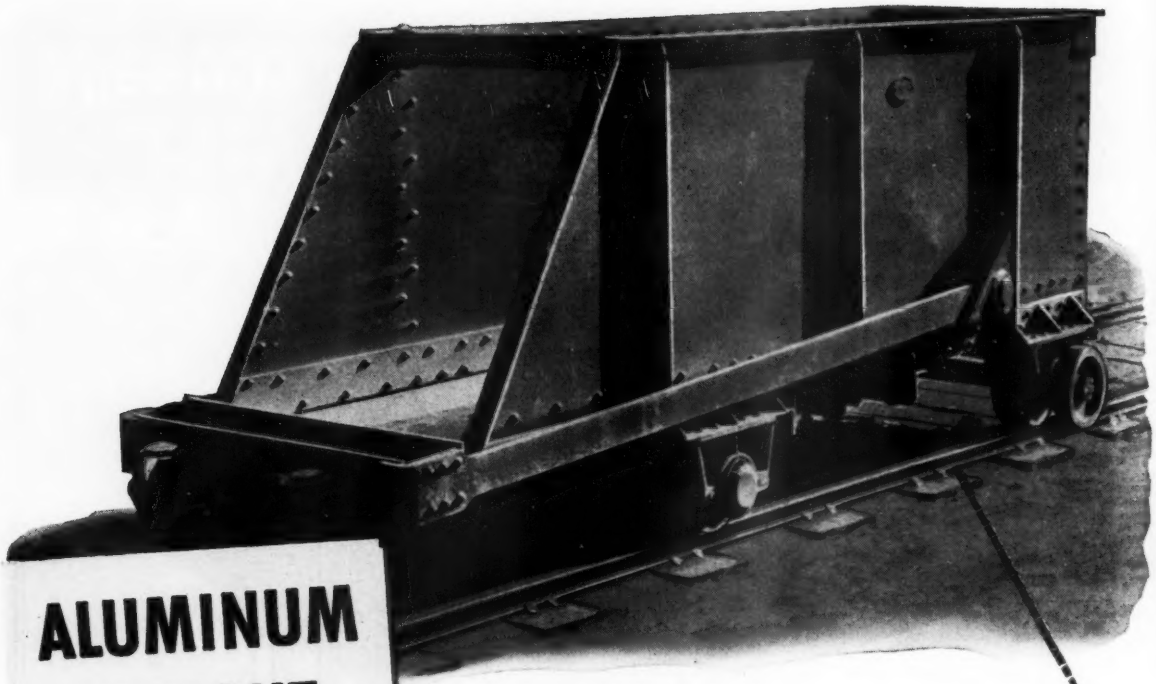
SANFORD-DAY "SEALED AUTOMATICS" CURTAIL COSTLY TRUCK CLEAN-UP

If you have denied yourself the economies and advantages of drop bottom mine cars because of coal dust leakage, then it will be good news, indeed, to learn that dust leakage has been eliminated in the new S-D "Sealed Automatic." The new Dust-Roof Seal being built into S-D "Automatic" Drop Bottom cars, plus a new sealed hood, seals coal dust in the car so it cannot dribble out and down on the tracks. This new development not only makes for safer, dustless haulage, but will also save thousands of dollars by eliminating the greatest portion of the costly track clean-up work.

Always a leader in the field, S-D "Automatics" are now better than ever. You still get the same big capacity and automatic unloading. You still get the improved long-life construction, and foolproof "Jerkout" unlatching device that operates underneath S-D "Automatic" cars. Now, with this revolutionary, money-making SEALED construction, you get the most efficient car the industry has ever known.

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. Knoxville 9, Tenn.



ALUMINUM IS LIGHT

ALUMINUM IS STRONG

These facts help gunboats work harder... last longer

An aluminum gunboat weighs half as much as a steel one. Easier hauling? Yes, and easier maintenance, too. Dents are easily bumped out without heating. You paint less because aluminum resists corrosion. And for the same reason, Alcoa Aluminum cars dump cleaner . . . leave no heel of coal and rock in the bottom corners.

That's why alert operators like Indian Head Collieries are ordering more aluminum gunboats. Whether you buy or build mine equipment, you should have the free book "Alcoa Aluminum and Its Alloys". Write ALUMINUM COMPANY OF AMERICA, 1478L Gulf Bldg., Pittsburgh 19, Pennsylvania. Or ask your local Alcoa sales office.

ALCOA FIRST IN ALUMINUM

ALCOA A C A ALUMINUM ®

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
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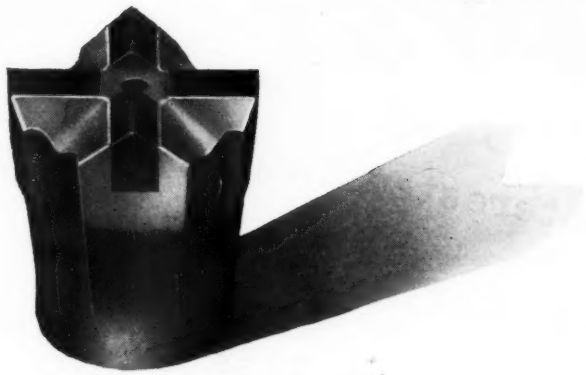
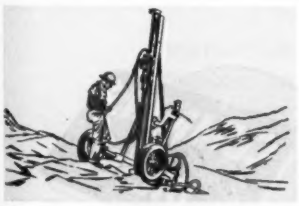
Carset Jackbits

Reduce air consumption at least 40%
Reduce drill maintenance as much as 30%
Save up to 30% on dynamite



HERE ARE A FEW TYPICAL REPORTS ON CARSET PERFORMANCE

ON A LARGE QUARRY JOB, drilling in hard trap rock with 45-lb. Jackhamers, steel bits dulled so quickly that they required 4 to 6 bits for a 2-ft. change — also the strain of forcing dulled bits caused excessive rod breakage. CARSET JACKBITS, now being used, are averaging 300 feet per bit. Rod life has been greatly increased and drill maintenance materially reduced.



ON A LARGE DAM PROJECT, 2" CARSET JACKBITS were used with 4" Wagon drills operating in hard dense basalt. These bits drilled 24-ft. holes in 22 minutes, while steel bits previously used required 66 minutes for an 18-ft. hole (with 10 bit changes). Footage was increased from 120 to 261 feet per shift. The contractor says "If I'd had CARSET JACKBITS at the beginning of the job, I'd have saved $75,000 to $100,000."

IN DRILLING LARGE BOULDERS, for blasting in an open pit operation, Jackhamer operators increased drilling speed from 4 inches per minute with steel bits to 10 inches per minute with CARSET JACKBITS. This combination of higher drilling speed and the saving of time previously lost changing bits, permitted them to complete 60% more plug holes per day.

A MINING COMPANY, drove 223 feet of 8 x 8 cross-cut in typical siliceous rock with 3" drifters and 1½" CARSET JACKBITS. Eighteen bits were used, averaging over 300 feet per bit. By drilling small uniform diameter holes with CARSET JACKBITS, they saved 8 pounds of dynamite per foot of advance, or total of $223. — which more than paid for the cost of the CARSET JACKBITS!

These and many more are the proved advantages of I-R CARSET JACKBITS

The performance and economy of Ingersoll-Rand's revolutionary CARSET JACKBIT are now a matter of record — proved by more than two years of actual field experience on all types of mining, quarrying and construction jobs.

This super-Jackbit set with Carboloy inserts, drills from 50 to 400 times as many feet of hole as the best steel bits available — with no appreciable gauge wear! It permits drilling of smaller, uniform-diameter holes to any practical depth, without binding and without bit changes. The elimination of tapered holes saves up to 30% on dynamite alone. And because it drills so much faster and easier, even in the hardest rock, the CARSET JACKBIT reduces air consumption per foot of hole 40% or more, and saves as much as 30% on drill maintenance. No wonder rock-drill men call it "The greatest single advance in rock drilling since the invention of the Jackhamer."

For the complete story on the CARSET JACKBIT, write today for your copy of our new 36-page, pocket-size catalog, Form 4091.

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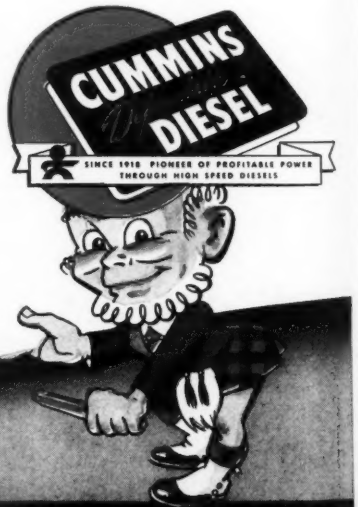
Choose Cummins Diesels

P.S. Your Cummins Dealer can show you proof. Call him today!



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It certainly takes POWER to Grind Ore

and it's best done in a MARCY Mill

It takes a certain amount of power to grind a ton of a certain ore to a certain size, regardless of mill design. The more power utilized by a mill, the greater the capacity or the finer the grinding. Size for size, MARCY Mills will grind more ore than other types because they utilize the maximum of power and utilize it efficiently. Their low pulp line permits greater impact of the grinding media, quicker removal of finished material with a minimum of overgrinding, and a higher pulp density for better contact between grinding media and ore. This means less floor space, power, and operating labor for a plant equipped with MARCY Mills. That is why MARCY Mills are found in so many grinding plants throughout the world, particularly in large installations.

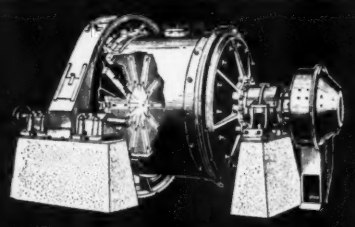
MARCY Open-End Rod Mills, pioneers in fine crushing or coarse grinding—Application of MARCY Open-End Rod Mills to take a coarse feed and, in one pass through the mill, prepare a fine product for the regrind mills is not new. They were doing this in 1919. To the right are a few of the early installations on this work.

As time went on, selective flotation replaced gravity concentration and changed flowsheets for the time being, but MARCY Open-End Rod Mills pioneered in single pass grinding, just as MARCY Ball Mills pioneered in major grinding developments since 1914.

A Few Early Installations	Date
3 Phelps Dodge plants	1919-1920
Cia. Minera Benificiadora de Inde	1921
The Fresnillo Company	1920
Southwestern Graphite Company	1923
Cerro de Pasco	1925
Hollinger Cons. Gold Mines	1923
Neg. Minera de La Mazata	1923
S. F. Mines of Mexico, Ltd.	1925
Bertha Mineral Company	1926
Cia. Minera de Penoles	1926

MARCY BALL MILLS Since 1914 have been world-wide choice for many plants. One of the companies listed (right) recently placed with us the largest single order for grinding equipment ever bought for any plant from any manufacturer! Repeat orders tell the worth of equipment, and many of the companies listed to the right, as well as others not shown, have placed successive orders for MARCY Ball Mills.

- Phelps Dodge Corporation
- Chile Exploration Co.
- American Smelting & Refining Co.
- U. S. Smelting, Refining & Mining Co.
- Kennecott Copper Corporation
- Climax Molybdenum Co.
- American Metals Co.
- Newmont Mining Co.



OTHER PRODUCTS

Massco Fahrenwald Flotation Machines; Genuine Wilfley Tables; Massco-McCarthy Hot Millers; Rock Bit Grinders; Density Controllers; Belt Feeders; Rubber Pinch Valves; Assay and Laboratory Supplies and Equipment; Complete Milling Plants.

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Representatives: Canadian Vickers, Ltd., Montreal; W. R. Judson, Santiago and Lima; The Edward J. Nell Co., Manila, P. I.; The Ore & Chemical Co., 80 Broad St., New York 4, N. Y., for Continental Europe.

For over a third of a century, MARCY Mills have been designed and built from experience and specialization in grinding. Qualified, experienced engineers and extensive field and test data assist in the selection of the proper size and type MARCY Mill for your grinding requirements. MARCY Mills assure you of appreciable savings due to . . .

These Features	with	These Results
Low Pulp Line		Increased Tonnage, Lower Per-Ton Costs
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Rapid Circulation of Mill Contents		Minimum of Overgrinding
Minimum Cushioning of Grinding Medium		Higher Pulp Density, Greater Efficiency
Greater Impact Drop		Improved Metallurgy in Many Flowsheets

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Announcing...

The New Kennametal Bit for Pin Hole Drilling

Kennametal FD Bits have a hard, durable cutting edge of solid Kennametal cemented carbide . . . tough body construction for lasting service.

The new pin hole drilling bit developed by Kennametal gives you 10% to 20% faster drilling speed than pneumatic methods. It drills hard shale, hard slate, and laminated sandstone. Holes are drilled in single gage, saving drilling time and giving your expansion units full contact area.

You get maximum speed in drilling medium roof . . . make big savings on equipment cost and handling time.

Let the Kennametal representative near you tell you the complete story on the new Kennametal pin hole drilling bit! He can recommend, demonstrate, and give your problems the benefit of his specialized experience.

Mining Division, Kennametal Inc., Latrobe, Pa.

KENNAMETAL INC.,
Latrobe, Pa.

Send me a free copy of Bulletin M-105, describing your new pin hole drilling bit.

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Company_____

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CLIP THIS COUPON — mail for particulars today!

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DRILL BITS • MACHINE BITS • STRIP BITS • ROCK BITS

124,000-POUND "NITRAMON" BLAST

combined economy and safety in Kentucky coal stripping operation

Before and after the blast

In shooting sandstone overburden to expose a rich, 14-foot seam of coal in eastern Kentucky, a recent blast with Du Pont "Nitramon"* proved the economy and safety of this popular blasting agent.

The blast required 124,000 pounds of "Nitramon," which was loaded in 97 nine-inch vertical holes spaced 24 feet apart and averaging 75 feet in depth. Holes were loaded immediately after drilling to avoid later relocation of drills to open blocked holes—an expensive, time-consuming job on this rough terrain. Many of these loaded holes were exposed to extremely wet weather for more than a month before the blast was fired.

Yet, as the post-blast photo shows (at left), results were excellent and shovels could quickly and easily start digging the 190,000 cu. yds. of well-broken rock.

Ask any Du Pont Explosives representative for complete information about "Nitramon" . . . its economy and safety for large or small stripping operations.

E. I. DU PONT DE NEMOURS & CO. (Inc.)
EXPLOSIVES DEPARTMENT
WILMINGTON 98, DELAWARE

*Reg. Trade-Mark for nitrocarbonitrate blasting agent

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

Check these features of "Nitramon"

Du Pont "Nitramon"—the safest blasting agent—cannot be detonated with commercial blasting caps. It is insensitive to open flame, friction or falling objects. It is safe to handle . . . safe to load, and a "Nitramon" Primer (itself relatively insensitive) detonates the charges.

Loading far in advance of firing a blast is a common, safe practice, because "Nitramon" is packed in water-tight metal cans. It is also non-headache-producing, a popular quality . . . particularly in hot weather.

In Underground Coal Mining . . . Du Pont Permissibles are Tops

"MONOBEL" AA

An outstanding producer of quality big lump coal and the most widely used permissible of all.

"LUMP COAL" C

An economical permissible with a slow, heaving action that places big lump coal away from the face for easy loading.

"GELOBEL" C

High-velocity gelatinous permissible with excellent water-resisting qualities. Ideal for hard rock and slate work.

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. . . THROUGH CHEMISTRY

LOW in Cost... BIG in Performance

NEW ALLIS-CHALMERS MODEL D

WEIGHT 8,500 lbs.
BRAKE HP. 34.7 (famous Allis-Chalmers gasoline engine).
SPEEDS — four forward, 2.40 to 18.61 m. p. h.; reverse to 2.37.

ONE-THIRD THE PRICE OF LARGE MOTOR GRADERS...

Yet has many big grader features — Tandem Drive, "Roll-Away" Moldboard, Tubular Frame, Hydraulic Blade Lift, Engine Over Drive Wheels, Drop Down Transmission, High Throat Clearance, Complete Operator Comfort, Full Visibility, Simplified Servicing.

Plus special attachments that widen its usefulness — Rear-End Loader, Scarifier, V-Type Snowplow with interchangeable blade for backfilling and light 'dozer work. Also various other accessories, including All-View Cab that is lifted off or replaced in a jiffy.

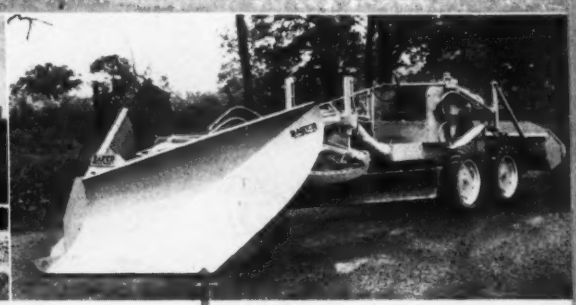
Ask your Allis-Chalmers dealer for a demonstration.

ENGINEERED FROM THE GROUND UP... to bring you BIG grader design and performance advantages.

Keeps the way smooth for your trucks at lowest possible cost. Maintains access roads, handles light construction . . . including building and cleaning ditches and slopes (up to 2:1).

HYDRAULIC SCARIFIER— does a surprising job ...rear-end weight keeps teeth ripping uniformly, at desired depth—smooth, positive steering.

LOADS MATERIAL into trucks with Tractomotive Loader—from windrows and stockpiles...surplus dirt or snow.



PLOWS SNOW with specially designed Baker snowplow (backfills with interchangeable blade).

ALLIS-CHALMERS

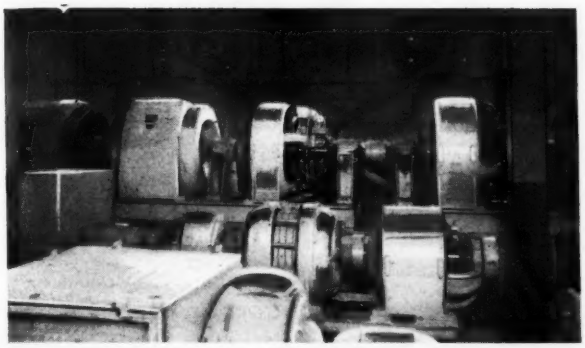
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

More earth moved in less time!

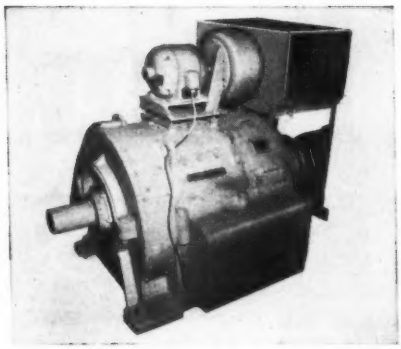
Substitution of a bucket with an approximate capacity of 46 cu yds in the place of its original and smaller one has made this Hanna Coal Co. machine, at Georgetown No. 12 mine, Ohio, one of the largest in the world. It is electrically equipped throughout by General Electric. Amplidyne control has resulted in substantially increased production. Though working on a 24-hour schedule, the shovel has lost practically no time for electrical maintenance since it was first put into operation in December 1946. More than 2500 shovels and draglines have been equipped with electric drive by General Electric.

AMPLIDYNE-CONTROLLED SHOVEL DRIVES

—to cut stripping costs per yard!

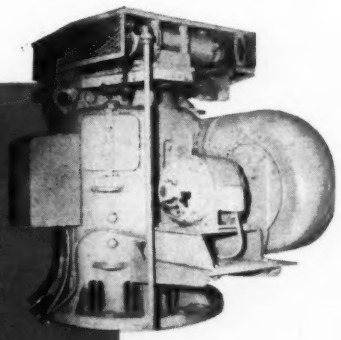


Hoist, swing, and crowd generators are driven by a G-E 1250-hp synchronous a-c motor (upper level). Shown on lower level is the power-factor amplidyne, exciter generator, and swing generator, all driven by a G-E 200-hp induction motor. The amplidyne synchronous motor field, says Mr. E. Gaston, electrical engineer of the Hanna Coal Company, maintains optimum power factor at full voltage, and reduces line losses to a minimum.

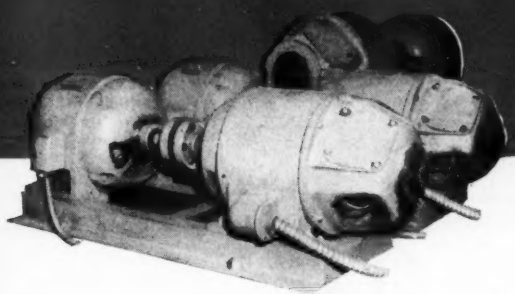


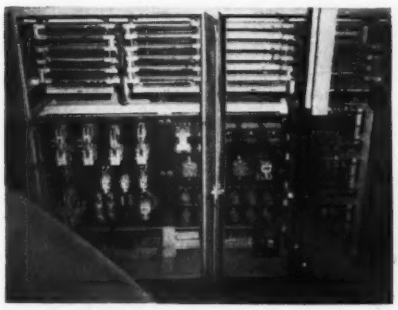
The huge bucket is raised and lowered by two G-E 425-hp MDP hoist motors, one of them shown here. Sturdy MDP motors incorporate such features as heavy steel frame to withstand severe service, dust-proof mountings for all bearings, improved banding and commutator design to permit operation at higher maximum safe speeds, and split frame to permit removal of top half for easy inspection of armature.

G-E amplidyne-controlled drive on Hanna Coal Company's giant stripping shovel provides faster hoist, swing, and crowd actions, works around the clock with minimum time lost for maintenance or repairs.



Swinging the shovel is the job of three G-E 125-hp MDV vertical swing motors (one shown at left). In addition to the main driving and control motors, some 30 auxiliary motors from 1- to 15-hp were furnished by G.E. for blowers, fans, oil pumps, steering, etc. Here an auxiliary Tri-Clad open dripproof motor drives the MDV motor's blower. Tri-Clad design and construction give three-way extra protection against physical damage, electrical breakdown, and operating wear and tear . . . proved by more than 1,500,000 Tri-Clads now in service.





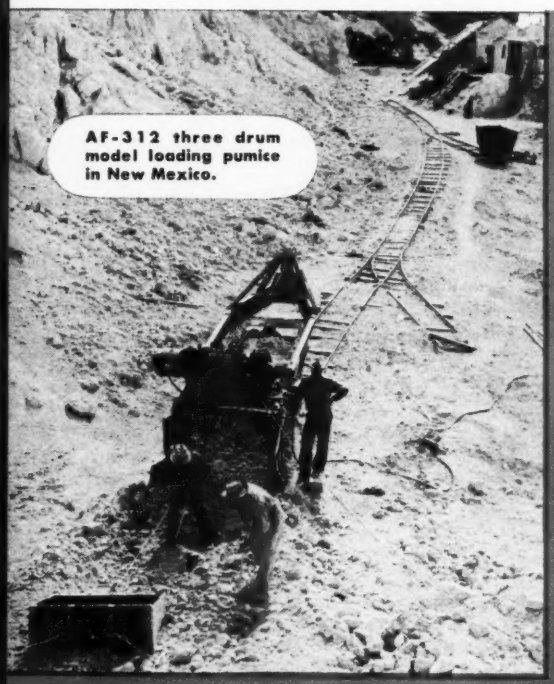
Amplidyne control of hoist, swing, and crowd actions gives the operator instant shovel response. It provides faster acceleration and deceleration to cut seconds off each pass and increase daily yardage handled. The three G-E amplidynes shown control the three shovel motions precisely. Even at high speeds, they prevent the excessive current and torque peaks which might damage electrical and mechanical equipment.

Simpler and more compact, the G-E amplidyne control panel shown uses fewer control devices, and takes up less space in crowded quarters. During the past six years, modern amplidyne control has been engineered into nearly all large shovels and draglines equipped by General Electric. For better results, make sure *your* shovels have G-E equipment throughout. ***Apparatus Dept., General Electric Company, Schenectady 5, N. Y.***

GENERAL ELECTRIC

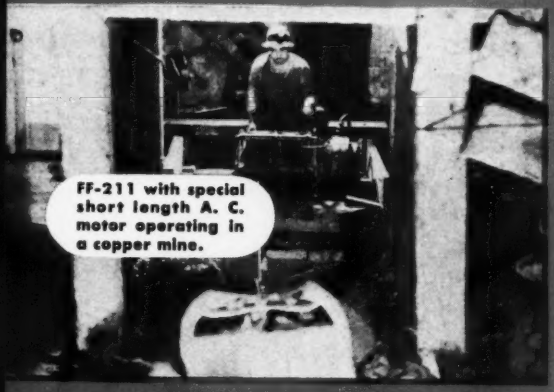
657-70

Known and Used



AF-312 three drum model loading pumice in New Mexico.

AAF-212 with 12 H. P. "Pistonair" motor slushing phosphate ore from a steep slope.



FF-211 with special short length A. C. motor operating in a copper mine.

S-211 "Pee-Wee" Slusher with "Turbinair" motor scraping out a small tunnel heading.

BF-212 Electric Slusher scraping hematite ore in an iron mine.

. . . JOY Sheave with safety hook and quick-opening "snatch block" construction.

WRITE for BULLETINS on JOY EQUIPMENT

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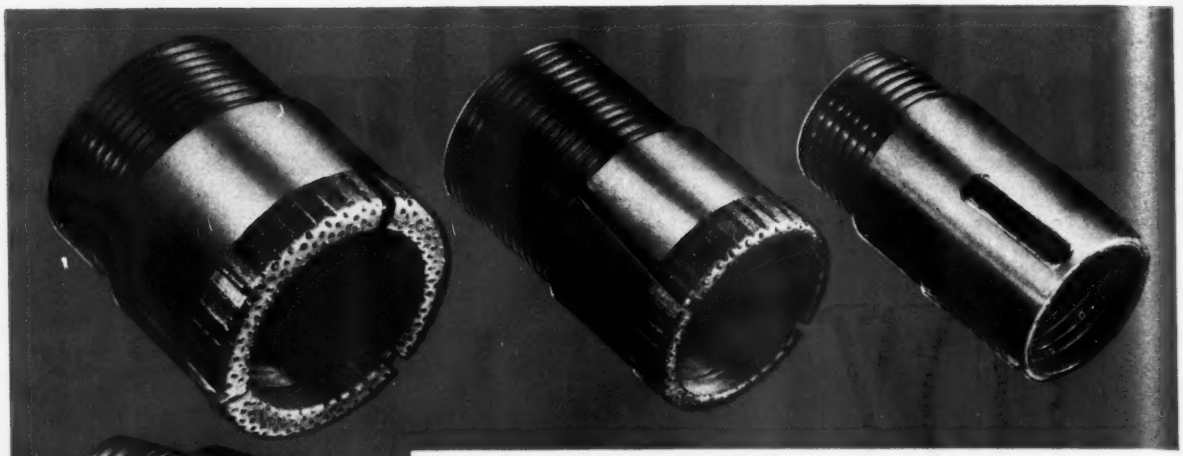

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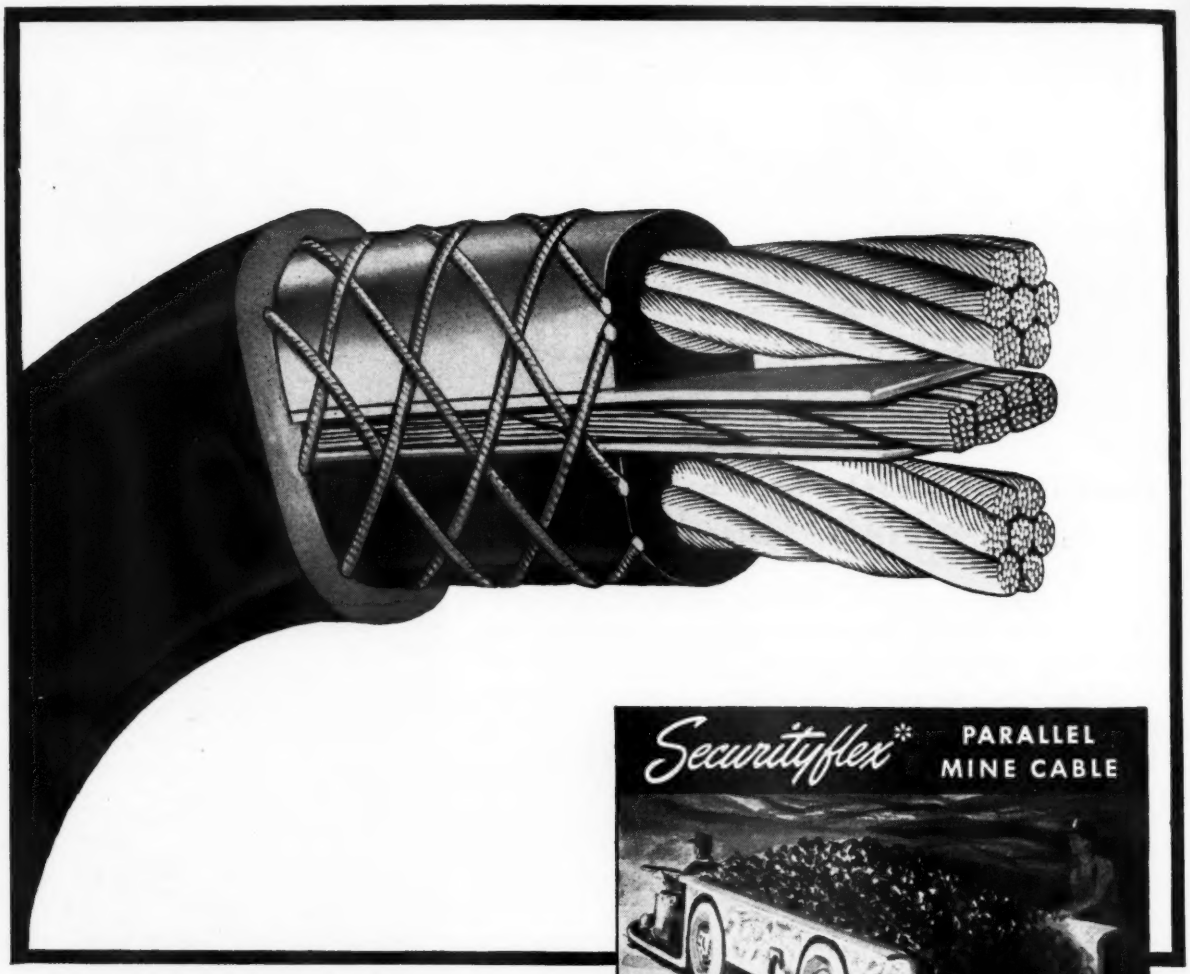

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★ Mining CONGRESS JOURNAL ★

Published for the Entire Mining Industry
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SHELDON P. WIMPFEN, *Editor*

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Tough Taxes Take Their Toll

EVEN under ideal conditions the business of finding mines is inherently a risky one, yet new mineral resources will be found provided proper stimulants exist. Probably the most effective incitement to mining investment, exploration and development would be revision of mining taxes in the light of the unique conditions which surround mining enterprises.

Vast sums of money are required to examine prospects and test their possibilities. The sole compelling incentive to undertake these risks is the possibility of commensurate financial reward. Under prevailing tax laws and procedures, the developers of a successful mine must surrender too large a portion of the financial returns from the infrequent successful enterprise to justify aggressive search for new mines. As a result, exploration is languishing.

It cannot be overemphasized that the real incentive to investment is the net amount that remains after taxes and after allowance for capital recovery. Current taxes subject the capital invested in coal, metal and nonmetallic mining enterprises to a real danger of erosion. Hence investment in mining has been less attractive than in the petroleum industry where the speculative hazards are fully as great.

To alter this situation and provide a favorable climate for mining investors, several important changes should be made in present tax procedure. First of all, expenses incurred in the exploration and development of mineral deposits should be allowed as a cost or prepaid expense—separate and apart from capital costs recoverable through depletion allowances. The costs of experimental work on mining and beneficiation should likewise be deductible as an expense.

In the petroleum industry exploration and development have changed the picture from one of shortage to relative abundance in the space of a few years. The oil industry has the option of expensing "intangible drilling costs," and certainly equally fair treatment should be accorded the mining industry.

Depreciation provisions should be liberalized and provision made to assure realization of the full amount required for replacement. Adjustment of current provisions for "carry back" and "carry forward" is needed to avoid imposition of unjust penalties on mineral producers. The objective could be attained by a five-year "carry forward" and a two-year "carry back" together with elimination of the special "adjustments" that deny the regular allowance for depletion.

Depletion recognizes that mineral deposits are wasting assets and provides for an allowable deduction in computing taxable income as a means of returning the capital value of the mineral deposit. However, the depletion provisions, intended to be simple and easy of application, have become snarled in a host of technicalities and restrictions which reduce the amount allowed and increase the tax payable. Clarification and a return to the original Congressional intent are called for. Individuals investing in mining should be permitted to receive tax-free distribution of capital represented by accumulated depletion reserves.

Serious consideration should be given to allowing new mining ventures a tax-free period after production has begun. Canada exempts metal and strategic mineral mines from income tax during a period of three years after the date of coming into production in reasonable commercial quantities.

To a growing extent, our tax laws and their administration have been a powerful deterrent to investment in mining. At the same time the increasing risk that must be taken to find new mines and the declining ore grades encountered have acted against maintaining adequate mineral supplies. Incentive has been stifled as taxes, superimposed on growing costs and wages, have forced the net return to a low that repels enterprise.

Tax revision in mining would assure a greater and more consistent supply of the minerals and fuels so important to the nation in peacetime and so vital in an emergency. The nation's overall economy would benefit from increased exploration, development and mineral production, and would bring a maximum of revenue to the Government.

Going, Going, Gone!

IN May 1948 we questioned "Must Mercury Die?" Since then inaction at home and revaluation of foreign exchange have given this vital metal mining industry a further push down the road to oblivion. A few operations cling on doggedly in the hope that some last minute action may revitalize them. In the meantime, one principal producer is mining its shaft pillars and another plans to follow suit in the spring.

Evidence was shown in these columns in June 1948 that tungsten was next on the list for tough sledding and possible exclusion from the roster of domestic metal mining industries. Revaluation speeded up the patient's decline when the price of foreign tungsten ores dropped to $18.50 to $19.50 per short ton unit of WO_3, a price which no domestic mine can meet and still realize a profit.

Immediately following revaluation, the price of antimony plummeted almost overnight from 40¾c to 26c per pound, with extensive offerings at this low figure.

An obvious result of the absence of a policy protecting these industries is complete dependence on Spain, Italy and Yugoslavia for mercury; on Communist China, Korea and Bolivia for tungsten; and similar uncertain sources for antimony.

We have long depended upon the Philippines, Turkey and Africa for chromium and upon Russia, Africa and India for manganese—two other minerals equally important to national defense.

Why no positive policy has been developed to prevent utter dependence on foreign sources we know not. Without adequate supplies of these five metals, we cannot fight a war and yet if these mines finally close, it may well take as much as four years to again reach maximum production—far too long in this atomic age. A healthy nucleus of production should be maintained in order to perfect the techniques for utilizing marginal or subeconomic resources so they may serve in an emergency. If this basic policy is not implemented, and another emergency arises, the economy doctors that dismembered these strategic metal producing industries will have some unburied corpses to explain.

Labor-Management Relations Today

Mutual understanding makes for full crews and high productivity

By HERMAN W. STEINKRAUS
President, Bridgeport Brass Co.
and
President, Chamber of Commerce of the United States

IN the fields of production, engineering, and research the record of American industry is an outstanding one. No nation of the world has ever before known so well how to search out raw materials from the earth, the forests, and the oceans, and turn them into such a variety of useful products for man's benefit. We learned how to produce them not for a favored few, but for the masses.

Yet, with all of this superiority in producing high quality products at low cost, we seem to be far behind in skill when we come to deal with the human element in our own plants or operations.

In the field of labor we recognize readily the names of union leaders, but hardly one prominent name occurs to us in the category of labor relations on management's side. Our leaders of industry in the past have devoted all of their time to the perfection of products and processes, advertising and selling. They have devoted little time to the subject of human relations.

In fact, until recent years employe relations were considered quite unimportant, and were usually turned over to some minor official in the company. How different the situation is today, when the tables are reversed. Formerly a manufacturer spoke and a plant was shut down. Now a leader of labor speaks and entire industries lie idle.

Mining was one of the first industries to be organized, long before the national unions came into being; and those independent unions, with their rough and ready methods, gave mine owners plenty of experience.

Recently half a million coal miners in 20 different states went out on strike. The strike in steel has taken out a half million or more workers, not to mention various other strikes.

Why do these things happen? Certainly something is basically wrong.

Truths to Learn

During the war years we made great headway in the matter of collective bargaining. We might well ask ourselves, "Why could we do it then, and find it so hard to do now?" The answer is, because during the war both labor and management were uniting for the same cause—to win the war. Up to now we haven't found any great unifying aim to take the place of "winning the war," and we certainly could use one big enough to tie both management and labor together.

In the editorials in *Life* magazine of September 26 the leading short editorial is entitled: "Weep for Cyrus Ching." It says: "Mr. Cyrus Ching, the distinguished head of the Federal Mediation and Conciliation Service, has just failed to settle a prolonged dock strike in Hawaii and was facing up to the steel dispute when he earned our sympathy with a brilliantly inconsequential remark. 'With no reflection on the people I have been talking with,' said Mr. Ching, 'I am just a little tired of the human race.'"

Cy Ching is one of the outstanding

men in the labor relations field today, and has been for many years. Over 70 years of age, he has spent a lifetime in industry in many capacities. He recently said: "Collective bargaining will fail unless labor and management both determine to make it work." He stated what is needed to make it work:

(1) An understanding of human relationships,
(2) The elimination of class thinking,
(3) The use of selling methods to sell the right ideas, with patience being used if first attempts fail, and
(4) A better appreciation of what motivates people.

One of the most profound analyses of this subject, after a group of experts had studied it with him for over three years, is about to be published by Robert Wood Johnson, chairman of the board of Johnson & Johnson. He found no pat formula, no nostrum to apply to the solution of labor troubles. After three and a half years of searching analysis and expert consultation, he comes up with this basic philosophy on which labor-management relations must be based:

"The idea that business is impersonal is fiction. Men are social creatures, sensitive to consideration of pride, achievement, desire for esteem and affection and similar non-economic drives. Likewise men have a conscience and a sense of justice. . . . Economic life today is interdependent. We are constantly influenced by our surroundings. Our character is molded in part by those about us, and we in turn affect our fellowmen. In business as elsewhere we deal with our fellowman and with all the aspirations of his nature. There is no 'economic man,' motivated only by thoughts of gain. Men do not change their nature when they put on their business suits or working clothes."

These are the great truths which we must all learn and then apply in our own actions.

Strikes Are Costly

Think of the cost to America of strikes from which no one ever really benefits. Consider the hardships on the workers and their families, and on the communities, stores, schools and churches, and on the manufacturers and stockholders, too.

Before the war we were losing an average of about 17,000,000 man-days every year through strikes. Then we had the bad peak year of 1947, with 116,000,000 man-days lost. Last year this figure had dropped to 34,000,000, which is still a lot of man-days to lose. That is over twice the number we lost in any year before the war. This year it was 10,000,000 for the first five months, but unless settlements are quickly reached in strategic places, we are going to end up with a pretty poor record for this year.

We must recognize that labor has strengthened its ranks tremendously. Their membership has increased in less than a decade from 8,000,000 to over 16,000,000 organized workers today. Steel, on which the spotlight rests today, has jumped from 5000 organized workers a brief 13 years ago to 1,000,000 unionized workers of today!

The two great unions, the AF of L and the CIO, who formerly had been at loggerheads with each other so much so that their efforts sometimes tended to nullify each other, today are openly united on most aims and most political issues. Both have become vital political factors, and openly state whom they will elect and whom they will defeat. In any district where there is an election they want to win, they move in with experienced publicity men and a political organization that wages a very effective campaign.

Progress Is Being Made

There are thousands of companies throughout the country which have good labor relations with their employes, and are getting out good production. As we look at these companies with such records and try to see if we can find some common denominator they all have, we ask—what is it they do, that the companies who have constant trouble fail to do?

Are they the companies who pay the highest wages, and give their employes the most benefits? No, not necessarily. Are they the companies who make the highest profits, and who can afford to share them? No, not necessarily.

Some of the companies which physically have the most difficult conditions of employment have excellent labor relations. In one place there are six large plants in a 50-mile area, paying the same wages, making the same products, under practically the same conditions. One has never had a strike, and the other companies have suffered considerably from strikes.

Of course, if any company persists in substandard wages and conditions of employment it cannot go on very long without running into trouble, but merely giving high wages, bonuses, pensions, and so on will not insure good labor relations. Good relations cannot be bought with money. They have to be earned in other ways.

A Right Attitude Is Essential

At the very roots of good relations in any plant or industry is management's respect for the worker as a human being, which is reflected in a friendly attitude toward his employes. That the worker may wear grimy workclothes, or live down by the tracks and may never have gone beyond the eighth grade, does not make his value as a person any less than if he went to college and lived up on the hill. There is something inherent in every person that makes him respond to respect shown him.

The worker's desires, feelings, hopes, and the good things he wants in life for his wife and family, you will find are not so different except in proportion from what you, yourself, feel and want for your wife and family. In every man there is a desire for something better than his father had. The worker wants to feel that his desires are considered sympathetically. These desires are simple and not selfish: we all have them.

Here they are:

(1) The sense of dignity and self-respect which is necessary for a satisfying life.
(2) The need for the esteem of others. No one wants to be laughed at or looked down upon.
(3) The instinct for survival; it's born in us.
(4) The desire for security, developed over the centuries.
(5) The social instinct which wel-

On these pages one of industry's outstanding leaders examines into current labor-management problems. Considerations vital to improved labor relations are analyzed and a program is outlined that points to peace and progress.

Herman W. Steinkraus

comes association with equals and loves teamwork in a common cause.

This covers them all. Workers are people, not machines or merely assets to production.

This friendly attitude must become a way of life. Good labor-management relations are not carrying around a contract and constantly referring to it for any decision or action. The contract may be important but, if the spirit of true cooperation is lacking, the contract may do more harm than good.

Workers Are People

The friendly attitude keeps workers informed. They want to know what is going on in their company. They don't want to hear things first from the outside. Managers with good labor relations do not keep their employes in the dark, but they tell them in every way possible about the production and other plans of the company, about new business, profits, or anything else they feel the workers would or could be interested in.

Then, too, if the chief executives of the company have a friendly attitude toward their workers, they will want some direct, firsthand contact with them. A correct idea of what working conditions are simply can't be obtained from reports, or from what some other person saw. But a visit by the top boss—that really registers!

This friendly attitude must also carry over to a friendly attitude toward the unions, accepting them as the choice of the workers, instead of merely tolerating them. Honest acceptance of unions is long overdue on the part of management.

No basic conflict need exist between the workers' loyalty to their company, and their allegiance to their union. Life is full of multiple loyalties, which can be adjusted by common sense. It is tough on the worker if he is made to feel he cannot be loyal both to his union and to his company.

The instinct for association is so deep that no program of human relations in a large plant can be worked out satisfactorily without organizing workers' groups in some fashion.

We too must show that we work for the worker's interests, and not merely tell him things or do things when we are forced to do them.

What really counts, is not words, but deeds, on the part of management—not just lip service. It is this foundation that is shaky. Without that, we just patch up one sore spot after another, and move from crisis to crisis. What we need to build is a solid foundation for our organization's spiritual health. We have been kept so busy patching up sick spots that we haven't taken time to build a system that would maintain good healthy relations all the time. That is our basic need.

Collective Bargaining Must Prevail

The second thing which all successful managements have in dealing with their employes is a strong, effective bargaining team on the local level, without outside domination of either party.

Collective bargaining came in with the Wagner Act in 1935. In 1947 the law was reaffirmed by the Taft-Hartley Act. This makes collective bargaining the official American policy of handling labor relations. But we have not as yet done a very good job of using it.

We are aided by the structure of conciliation and arbitration, which has expanded tremendously in the last few years. We have had several important developments, such as the independent National Conciliation Service, headed by Cyrus Ching, with its 263 branches in various cities. Also, state mediation boards operate in several states, and there are good labor-management groups in some cities—such as those that have been formed in Boston, Toledo, Louisville, and other places. They have been very effective in preventing local troubles from reaching a strike stage.

Now we are hearing quite a lot about fact-finding boards, such as the Steel Fact-Finding Board appointed by the President.

But I am referring now to bargaining with your own people in your own plants on the local level, with representatives from the employes, the union representatives, and those from management. The further you let your troubles get out of your own territory and out of your own hands, the more apt you are to weaken the fiber of your own good labor relations. In the Steel Board's report local bargaining is strongly favored. This is a sound recommendation.

Finding the answer by give and take at your own bargaining table is strengthening; giving up and having to call in outside arbitration is weakening. I remember one employe who sat at our bargaining table, and who said as a ticklish point was reached, "We can crack this one; we've settled worse than this." That spirit is all gone when you have to call in someone else for a decision. And remember, in collective bargaining the most necessary ingredient is patience. You've got to take time. Rushing is often fatal. Sometimes it is just a very small thing that seems to turn the tide. A little thoughtfulness and a friendly attitude can be the turning point, and accomplish something weeks of negotiation has not quite done.

Three Bad Hurdles

At present there are a few hindrances to good collective bargaining, and I would like to mention them. Often they are the things that make the collective bargaining fail.

A. Too many times the parties to collective bargaining come to the table with firm commitments already made, either management to its board of directors, or union representatives to the union headquarters, or to some top union executive who gives his orders from across the country. When that happens you just go through the motions of collective bargaining.

B. A strike vote is taken before negotiations start. How often that happens! Right then and there a big hurdle is set up. No one can muster the right spirit of bargaining when over one's head is the threat, "You come across or we strike."

C. There is altogether too much name-calling. The picture that labor makes of the bloated, rich, fat capitalist, and the attitude of some management that unions are troublemakers and crooks, are both not helpful towards good collective bargaining.

Plan Ahead

The third thing which all companies do which have good labor relations as far as I can observe is to plan ahead in matters of employe relations. We plan ahead for production and engineering and sales in our companies; but how many of us plan ahead for good relations with our employes? The unions are planning ahead. They know just what they want, and are prepared for how they are going after it.

Too often their demands take us completely by surprise, and we have to do some hasty thinking to answer their demands. We are really not prepared. Often we find ourselves on the defensive. Ample proof of this is readily available.

Many companies have had pension plans for years, but some have no pension plans at all. About 5,000,000 workers now are covered by company pension plans. The big question is, will labor and management work out something fair, or will big government step in?

Another subject of interest is the matter of profit-sharing. More and more companies are setting up some form of profit-sharing because it makes partners of their workers. Lincoln Electric, of Cleveland, is an outstanding example. The big drawback is that most of the plans function well in good times, but there has appeared no adequate plan yet that is able to hurdle the period when times are bad and there are no profits to share.

Take the subject of the guaranteed minimum annual wage, for which there have been some demands. These

arose from the fact that in some industries employment has not been very steady, sometimes because of lack of planning, sometimes because of annual models, etc. Steadier employment schedules would have prevented this type of demand. It's profitable to have a steady curve of production instead of violent ups and downs.

We simply can't wait until these issues are put right in our laps, often with a strike threat. We must look ahead, and plan ahead, and have some concrete things in mind for our employes. These subjects are to be the issues of the future, whether we like it or not.

Labor Leaders Are Skillful

Labor has been studying these issues for some time. Unions send their organizers to the leading colleges of the country to take studies in economics, labor relations, and the welfare field. Just this summer the steel industry had 143 union steelworkers studying at the University of Illinois. Many unions have scholarships at Harvard, Yale and other colleges, where promising men are sent to be trained as labor organizers and labor representatives. They study concrete subjects like how to analyze a financial report, public speaking, psychology, elements of cost, and profits, as well as political economy and sociology.

An entirely new type of labor leader is coming along. He is often young, well-educated, sincere, often idealistic, socialistic, but he is hard-bitten and well versed in all matters pertaining to the welfare of labor. Don't underestimate him. And you had better have top-caliber men to deal with him—and see that they get training, too.

Labor is using the latest means to present its case to the public. For instance, their films are strong, exaggerated, and in many parts untrue, but they forcefully present labor's ideas in form to influence the public.

We have to put far more thought and planning to this subject than we have before, if we can even expect to meet labor on equal grounds.

Tell the Community

Here is another important thing for company managements to do. Develop good relationships between your company and the communities in which your plants are located. A favorable and informed public opinion about your company has a great bearing on the pride which your workers will feel about working there. And in time of trouble the feeling of your community towards you and your company will have a great bearing upon what happens.

Once after my company had succeeded in preventing a serious strike at a time all the other companies in our industry were struck, I thanked the editor of a local labor paper for his help in giving a straight story to the community through his paper.

"Well," he said, "it's nice of you to thank me, but you know you had a bank account you were able to draw on. . . . You built up a bank account of good will in the community and with your employes. When the crisis came you found you could draw on that account, and you had enough to see you through safely. You can't do that when conditions are tough; you've got to do it long before."

People Are Thinking

The American people are beginning to show a new critical and appraising attitude on labor-management matters. They are beginning to think for themselves. They didn't get taken in by the incessant hammering against the Taft-Hartley Law. Of course slave labor law it never was. More nearly, it may prove to be a Save Labor Law, saving labor from the excesses, losses and heartaches that always come with labor strife.

Secondly, the public is tired of strikes. They are impatient with violence that all strikes breed. They don't believe that collective bargaining has been used as well as it should.

Strikes are really an outmoded weapon. They belong to the age we have lived through, not to the age to come. Strikes are linked to strife and hatred; they have no sound place in the new world we want to build for our children; they have no real foundation in our Christian, intelligent, and civilized world.

In Conclusion

We need to do a much better job in establishing sound and cooperative relations between management and workers. This must be based on the broad philosophy, the basic concept, that workers are human beings who respond to fair treatment.

The American people expect labor and management to find better answers than strikes. Unless we do, we may expect more and more government intervention. A growing public opinion will insist that something be done, and if private industry fails, the public will look to government.

If we tackle this problem as intelligently as we have always tackled our production, sales and engineering problems, we will find the right answers.

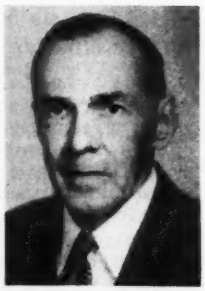
We have everything we need in this country to have labor-management peace. We simply have to bring our thinking up to date on these fundamental principles. Then we have to have a plan of procedure. We really know what needs to be done. It remains for us to go ahead and do it.

Sound relations result in maximum employer-employe cooperation

Diesel Power Underground

Loading a ten-ton truck with slusher drag. Note oxygen tank

Tri-State Mines Successfully Mechanize with Trackless Equipment



By S. S. CLARKE

General Superintendent
Tri-State Mines Division
Eagle-Picher Mining and Smelting Co.

FOR two years prior to the first installation of Diesel power underground, the nearly universal prejudice, plus laws in some states prohibiting its use, appeared to be unsurmountable obstacles. Yet the application was under discussion and the mine staff was of the opinion that the carbon monoxide hazard could be reduced to a permissible low. Improved combustion in Diesels, plus the natural ventilation, left but occasional periods when the CO content exceeded the U. S. Bureau of Mines recommended permissible of 100 ppm, or 0.01 percent.

Tests were started using scrubbers, various chemicals were investigated, compressed air was introduced into the exhaust, but none of these met with our approval. Finally it was decided to introduce oxygen into the exhaust, on the theory that with sufficient heat further oxidization would occur and convert some CO to CO_2.

There are diversified opinions as to the effectiveness of this application. However, with perfect engine adjustment, good fuel oil and ample ventilation, and in dead ends, or jugs, when fresh air is added at the rate of 75 fpm per horsepower the CO hazard is practically nil. Fig. 1 shows a portable, electric driven, 5-ft blower that is used successfully in dead ends to start air movement. However, this condition does not always exist.

Oxygen Lowers CO in Most Tests

In starting, and sometimes when idling, or with the engine in need of overhaul, the CO content will exceed the permissible minimum. Gas samples are frequently taken both with and without using oxygen. These samples are taken in the exhaust pipe, in the breathing zone of the operator, and in the mine atmosphere at loading and dumping terminals. A recapitulation of the last group of samples taken from all types of Diesel equipment—loaders and trucks powered by both two-cycle and four-cycle engines—showed a definite reduction in CO content in 54 percent of the samples taken while oxygen was being used. However, 40 percent of the samples showed the same CO content with or without adding oxygen, and, for some unexplainable reason, one sample showed more CO content with oxygen than without.

Both Oklahoma and Kansas feel that some benefit results from the oxygen application, as they insist on its use and frequently take air samples.

On the theory that better combustion would occur, thus increasing the engine efficiency and also reducing the CO content of the exhaust gases, the question is frequently asked "why not introduce oxygen into the intake line?" The small increase in engine efficiency may be offset by the high cost of oxygen. Positive control of oxygen feeding would have to be developed, as an over rich mixture would be injurious to the engine. Experience has demonstrated the danger of explosion and fire. In a few instances the operator failed to completely shut off the oxygen when shutting down his machine; some oxygen worked into the cylinders and upon starting the machine again, an explosion occurred. It was most fortunate that no one was injured nor any appreciable damage done to the engine.

An opinion offered by some engine manufacturers is, that the introduction of additional oxygen with inlet air would produce little effect on a Diesel engine operating with normal fuel quantities, since few Diesel engines are able to burn more than 80 percent of the available oxygen normally supplied with atmospheric air.

It is possible that some benefits would be derived from oxygen addition in the intake line, in special cases, particularly military. The Navy has been carrying on tests using an oxygen boost for high altitude flying. The results of these tests and observations are published by the Aeronautical Engine Laboratory, Naval Air Material Center, under the title "Oxygen Boost of Engine Power at High Altitude," by Francis Masi.

Trackless Mining Extends District Life

A fleet of 25 Diesel-powered trucks are now operating in several Eagle-Picher mines with complete success. The advantages of trackless mining will permit this low grade mining district to exist for several years beyond the economic life of track haulage using either cans or mine cars with either electric locomotive or tail rope motive power. Trackless haulage is flexible, and permits moving into old mines and shooting out bright spots which frequently lead into another ore run.

Two types of truck bodies are in use, the semi-trailer and the dump bed (Figs. 2 & 3). The semi-trailer was designed for use in sheet ground where ample turning radius is available and requires about 2 ft less head room for dumping clearance. This lower clearance is a factor when the

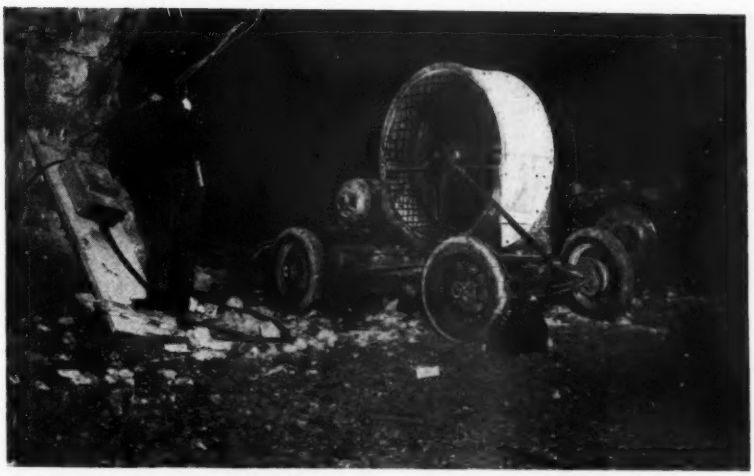


Fig. 1. Portable blower starts air movement in dead ends

Fig. 2. Semi-trailer used in sheet ground has low clearance

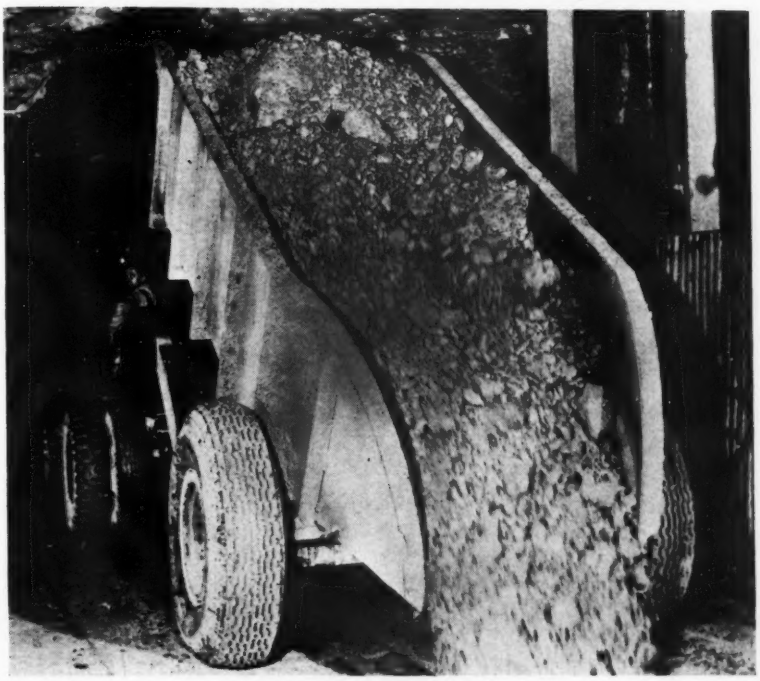


Fig. 3. Semi-trailers haul ten-ton loads

USBM GAS ANALYSIS OF DIESEL EXHAUST GASES
KENOYER MINE, APRIL 1949

Description of Sample	With Oxygen 12 L.P.M. Mine Air #3 HD-5 Loader GMC—two-cycle Operator's breathing zone—end of two-minute idling period	Without Oxygen Mine Air #3 HD-5 Loader GMC—two-cycle Operator's breathing zone—end of three-minute idling period	With Oxygen 12 L.P.M. Diesel Exhaust #3 HD-5 Loader GMC—two-cycle Full load	Without Oxygen Diesel Exhaust #3 HD-5 Loader GMC—two-cycle Full load	With Oxygen 13 L.P.M. Diesel Exhaust #3 HD-5 Loader GMC—two-cycle End of two-minute idling period	Without Oxygen Diesel Exhaust #3 HD-5 Loader GMC—two-cycle End of two-minute idling period
	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft	1000-ft. N.E. #1 Shaft	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft
Date & Hour Sampled	4/5/49–10:50 am	4/5/49–11:02 am	4/5/49–10:25 am	4/5/49–10:35 am	4/5/49–9:20 am	4/5/49–9:33 am
Carbon Dioxide CO_2	0.07	0.08	4.54	3.82	0.70	0.57
Oxygen O_2	20.87	20.85	14.67	15.55	20.04	20.14
Carbon Monoxide CO	0.02	0.00	0.02	0.02	0.00	0.00
Methane CH_4	0.00	0.00	0.02	0.00	0.04	0.03
Nitrogen N_2	79.04	79.07	80.75	80.61	79.22	79.26
Oxide of Nitrogen NO_2 ppm	Trace	Trace	176	243	13	10

Description of Sample	With Oxygen 12 L.P.M. Diesel Exhaust #3 HD-5 Loader GMC—two-cycle End of three-minute idling period after 18th truck load	Without Oxygen Diesel Exhaust #3 HD-5 Loader GMC—two-cycle End of three-minute period after 19th truck load	With Oxygen 12 L.P.M. Mine Air #3 HD-5 Loader GMC—two-cycle Operator's breathing zone after two-minute loading period, 20th load, engine idling	Without Oxygen Mine Air In vicinity of drill jumbo—40 ft west and 10 ft above Diesel operations
	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft	1000-ft N.E. #1 Shaft
Date & Hour Sampled	4/5/49–2:18 pm	4/5/49–2:24 pm	4/5/49–2:42 pm	4/5/49–2:50 pm
Carbon Dioxide CO_2	0.41	0.57	0.10	0.14
Oxygen O_2	20.48	20.10	20.80	20.76
Carbon Monoxide CO	0.02	0.03	0.00	0.00
Methane CH_4	0.00	0.02	0.00	0.00
Nitrogen N_2	79.06	79.28	79.10	79.10
Oxide of Nitrogen NO_2 ppm	27	0	0	7

USBM GAS ANALYSIS OF DIESEL EXHAUST GASES
WEBBER MINE, APRIL 1949

Description of Sample	With Oxygen 12 L.P.M. Mine Air Eimco Loader 400-ft S.E. Shaft Operator's breathing zone—end of one minute idling period	Without Oxygen Mine Air Eimco Loader 400-ft S.E. Shaft Operator's breathing zone—end of one minute idling period	With Oxygen 12 L.P.M. Diesel Exhaust Eimco 400-ft S.E. Shaft Full throttle	Without Oxygen Diesel Exhaust Eimco 400-ft S.E. Shaft Full throttle	With Oxygen 12 L.P.M. Diesel Exhaust Eimco 400-ft S.E. Shaft Idling speed	Without Oxygen Diesel Exhaust Eimco 400-ft S.E. Shaft Idling speed
Date & Hour Sampled	4/6/49–2:00 pm	4/6/49–2:05 pm	4/6/49–1:50 pm	4/6/49–1:55 pm	4/6/49–1:35 pm	4/6/49–1:45 pm
Carbon Dioxide CO_2	0.10	0.07	6.31	6.27	0.55	1.03
Oxygen O_2	20.77	20.76	12.44	12.28	20.27	19.53
Carbon Monoxide CO	0.00	0.01	Lost	0.01	Trace	0.02
Methane CH_4	0.00	0.00	0.00	0.00	0.00	0.00
Nitrogen N_2	79.13	79.16	81.25	81.44	79.17	79.42
Oxide of Nitrogen NO_2 ppm	7	0	74	79	7	

USBM GAS ANALYSIS OF DIESEL EXHAUST GASES

WESTSIDE MINE, APRIL 1949

Description of Sample	With Oxygen 13 L.P.M. Diesel Exhaust Truck No. 1 Cummins Engine Normal operating speed	Without Oxygen Diesel Exhaust Truck No. 1 Cummins Engine Normal operating speed	With Oxygen 12 L.P.M. Mine Run Truck No. 2 Cummins Engine Operator's breathing zone—end of two minute idling period	Without Oxygen Mine Run Truck No. 3 Cummins Engine Operator's breathing zone—end of two minute idling period	With Oxygen 12 L.P.M. Diesel Exhaust Truck No. 3 Cummins Engine Loaded Truck Full throttle	Without Oxygen Diesel Exhaust Truck No. 2 Cummins Engine Loaded Truck Full throttle	With Oxygen 13 L.P.M. Diesel Exhaust Truck No. 2 Cummins Engine End of two minute idling period	Without Oxygen Diesel Exhaust Truck No. 1 Cummins Engine End of two minute idling period
	500-ft N. Shaft	500-ft N. Shaft	Shaft Hopper	Shaft Hopper	100-ft N. Shaft	100-ft N. of Shaft	Shaft Hopper	Shaft Hopper
Date & Hour Sampled	4/6/49–10:40 am	4/6/49–11:02 am	4/6/49–10:24 am	4/6/49–10:30 am	4/6/49–10:12 am	4/6/49–10:22 am	4/6/49–9:30 am	4/6/49–9:40 am
Carbon Dioxide CO_2	2.73	3.32	0.08	0.09	5.87	4.72	0.89	0.67
Oxygen O_2	17.38	16.37	20.80	20.87	12.95	14.43	20.00	20.01
Carbon Monoxide CO	0.04	0.04	0.00	0.00	0.05	0.05	0.02	0.02
Methane CH_4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitrogen N_2	79.85	80.27	79.12	79.04	81.13	80.80	79.09	79.30
Oxides of Nitrogen NO_2 ppm	114	21	2	0	Lost	44	11	44
Eimco without O_2 Idling Speed NO_2	75							

KENOYER MINE

Description of Sample	With Oxygen 13 L.P.M. Diesel Exhaust Truck No. 3 GMC—4055 During four-minute idling period 1000-ft N.E. No. 1 Shaft	Without Oxygen Diesel Exhaust Truck No. 3 GMC—4055 During four-minute idling period 1000 ft N.E. No. 1 Shaft	With Oxygen 13 L.P.M. Diesel Exhaust Truck No. 3 GMC—4055 On 3-deg slope with load 1000-ft N.E. No. 1 Shaft	Without Oxygen Diesel Exhaust Truck No. 3 GMC—4055 On 3-deg slope with load 1000-ft N.E. No. 1 Shaft
Date & Hour Sampled	4/5/49–1:30 pm	4/5/49–1:25 pm	4/5/49–1:55 pm	4/5/49–2:10 pm
Carbon Dioxide CO_2	0.41	0.00	0.04	1.91
Oxygen O_2	20.50	20.10	20.86	18.22
Carbon Monoxide CO	0.01	0.02	Trace	0.01
Methane CH_4	0.00	0.00	0.00	0.00
Nitrogen N_2	79.08	79.28	79.10	79.86
Oxides of Nitrogen NO_2 ppm	12	47	165	30

roof is bad. The capacity of both beds is ten tons. They are hydraulically dumped by means of two 7-in. cylinders, and after a period of time the "duck-bill" type of dump bed was found to be more economical to maintain than either the bottom drop or the box type. The bottom liner and two strips at the throat are the only wearing parts to be replaced on the "duck-bill" type, whereas the doors and door frames of the other two types need frequent repair.

Custom-Built Trucks Fit Special Conditions

When trucks were first purchased and proposed for mine haulage, the large auto and truck manufacturers were not interested and offered no suggestions or encouragement in this innovation. Finally, one custom truck manufacturer rather reluctantly agreed to build a unit. The benefits were so obvious that several more units were built and placed in service.

The use of trucks is now so well established in this field that other districts with similar conditions are investigating the possibilities of a change-over to trucks and all the truck manufacturers are becoming interested in the large potential market.

One of the principal advantages of custom-built jobs over production-line trucks is the fact that they are built to suit changes that were found necessary; i.e., strut spacing for the power take-off; clearance for the hydraulic cylinders; different styling and heavier material for bumpers and fenders; auxiliary guard over the radiator and crank case, and changes on the exhaust pipe. The custom builders are cooperative in making changes in the chassis to meet conditions and they follow the operations in order to continue improvements.

A well-maintained road bed is essential to good truck performance. Where possible chats are passed down a drill hole discharging into a small hopper in the mine. At odd times the trucks spread chats where needed to build or repair haulage roads.

Good fuel oil is necessary for efficient engine performance. The analyses of the fuel oil used which has proven satisfactory is given:

U. S. BUREAU OF MINES ANALYSES

Specific gravity 60/60 F	37.4 A.P.I.
Sulphur content	0.17%
Flash point (Pensky-Martens)	158 F.
(Tag closed cup)	152 F.
Aniline point	71.0 F.
	160.0 F.
Viscosity (Saybolt) at 130 F.	37.2 seconds
Carbon residue (Conradson) (10 percent of residum obtained by adaptation of ASTM D 159)	0.03%

Calculated cetane number—54.

Each mine has a maintenance man who takes care of minor repairs, tires, etc. Major engine repairs and adjustments are handled by a skilled crew of Diesel mechanics working out of the main shop.

The chassis is equipped with 9:00 by 20, 12-ply tires, and the trailer with 13:00 by 20, 14-ply. The trailer weighs 7350 lb. Dump trucks are equipped with 9:00 by 20, 12-ply with dual tires on the rear.

Good Roads Increase Tire Life

Tire life is in proportion to the attention given to road maintenance. Tire failures are principally due to cuts caused by sharp flint boulders falling from the truck or spalling from pillars. Owing to this hazard the tire manufacturers have recommended that tire pressure be reduced about 30 percent under the pressure recommended for surface trucks. Since this practice has been followed tire failures have been materially reduced.

Cost per ton is hardly a measuring stick for comparing Diesel haulage with haulage operations in other mines or districts as many conditions are different; methods of keeping costs vary. The distribution of supervision varies with different companies; another variable occurs if wet or dry weights are used. The tons hauled per truck per shift is, perhaps, the basis of arriving at a cost for comparative purposes.

The average haulage cost per dry ton of 18 operating miners using all types of haulage, trucks (Diesel and battery), battery locomotives, tail-rope haulage, incline haulage, for a given period of time, totaled 34.1¢ per ton; this includes operating labor, repairs, supplies, power, compensation insurance, and a proportion of supervision.

OPERATING DATA ENDING 12/31/48

	Mine "W"	Mine "WS"	Mine "P"	Mine "N"	Mine "GW"	Total Average
Mine shifts	404	316	155	293	99	1,267
Truck shifts	404	1,000	310	413	200	2,327
Total trips	7,538	20,996	11,232	7,950	4,587	52,303
Total mileage	3,180	13,678	4,605	6,440	2,780	30,683
Total tonnage	75,380	209,960	110,135	79,500	45,770	520,745
Trips per shift	18.6	21.0	31.2	19.2	22.9	22.5
Miles per trip	.42	.65	.41	.81	.60	0.59
Miles per gallon fuel oil	1.70	2.50	3.72	4.44	2.27	2.72
Daily tonnage per truck	186.0	210.00	355.2	192.0	208.0	223.8
Miles per shift	7.8	13.7	15.0	15.6	13.9	13.2
Gallons fuel oil	1,885	5,471	1,235	1,450	1,225	11,266
Truck driver wages on semi-trailer					$1.35½	per hour
Truck driver wages on dump truck					1.32½	" "
Head Diesel mechanic					1.59½	" "
Diesel mechanic					1.44	" "
Diesel mechanic helper					1.38½	" "

Haulage Costs Vary

Four mines that have both Diesel and battery trucks show an average cost of 22.4¢ per rock ton. One particular mine helps to give this low figure as conditions are such that battery trucks are used on short hauls and the Diesels are on hauls of over a mile. Four mines on Diesels show an average cost of 25.1¢ per rock ton. The mine that has had Diesels the longest shows a cost of 18.5¢ per ton as the roads have had over a year's maintenance and are in good condition and the drivers are more experienced. The high Diesel-cost mine showed a cost of 35.4¢ per ton. This mine started from scratch; roads had to be built and inexperienced drivers caused considerable repair expense. On a basis of past experience, time will bring this mine to a lower cost favorable with older mines.

Some mines are still using tail-rope haulage at an average cost of 44.1¢ per ton. Several mines offer rather difficult haulage problems due to local conditions and are using combination haulage methods; battery locomotives in connection with inclines generally require an incline hoistman and a rope rider to bring the cans up to the haulage level. These mines have an average haulage cost of 69.6¢ per ton.

Work is now in progress to convert three of these high cost mines to truck

Fig. 4. Ten-ton trucks hydraulically dumped

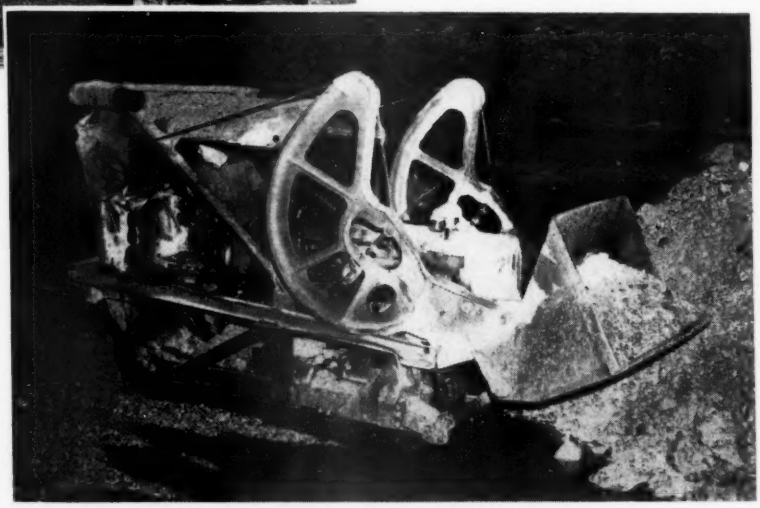


Fig. 5. Cat-mounted loader can dig below pad level

haulage and it is hoped that where conditions warrant, most of the others will be converted.

Diesel-Powered Loading Equipment

Prior to the decision to convert to trackless mining, all loading was done by either slusher drags mounted on self propelled "cats" or track-mounted shovels as manufactured by Eimco, Gardner-Denver, and Joy. This method was rather expensive and not flexible to suit conditions.

Plans were discussed with Eimco to enlarge their standard loader (12B) to permit mounting on a caterpillar crawler. At the time of delivery, the State of Oklahoma had not yet amended the mining law to permit Diesels underground, so it was deemed best to substitute an electric motor in place of the Diesel. The results were fairly satisfactory, but not what was desired. It showed that the loading principle was good but the electric power was expensive and troublesome. When the law was amended the Diesel unit was immediately installed.

Loading Costs Compared

Loading costs presented here were compiled some time ago and are based on the lower wage scale prevailing at that time.

	Electric Motor	Diesel Engine
Days operated	205	150
Total tons loaded	25,440.6	23,220.2
Daily average	124.1	154.8
Best day's output	285.0	300.0
Costs		
Operating labor per ton	$.1494	$.0747
Maintenance labor per ton	.0049	.0078
Repairs and supplies	.1301	.0703
Power	.0150	.0072
Total	$.2994	$.1600

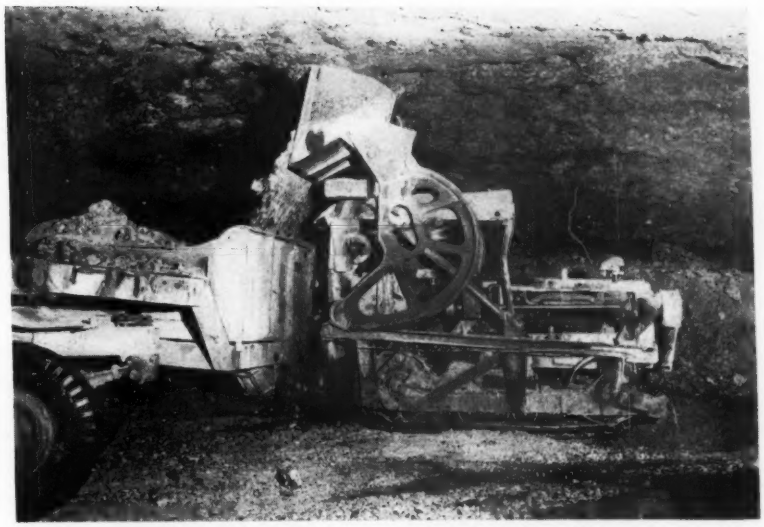


Fig. 6. Without pivoting, this unit casts its load into waiting truck

Fig. 7. The HD-5 pivots to load

Fig. 8. Diesel-powered HT-4 loads a ten-ton truck

Fig. 9. With mast collapsed, jumbo starts to climb muck pile

Fig. 10. Drilling out a high back with a 35-ft mast jumbo

The highly abrasive nature of the Tri-State flint causes excessive wear on crawler pads and dipper lips. Experiments are being made on hard surfacing these parts and some manufacturers are now supplying pads of different alloys that show decided improvement over pads supplied as standard equipment.

Another loading problem that confronted the operating department was "sludging bottom," that is recovering scattered ore rock, old track beds and shoveler's bottoms, a result of the days of hand shoveling. The shovelers laid a platform of heavy planks at the toe of the stope to receive the blast and make shoveling easier. Fine rock shifted through the cracks and in time made a layer several inches thick of very rich sludge.

A decision was made to try a Diesel-powered crawler using either a dozing blade or a dipper. This type answers a two-fold purpose in sludging bottom and maintaining road. The dipper will dig below the pad level and does a fairly good job of sludging when the extreme unevenness of the mine floor is considered.

Three types of loaders are now in use—the Eimco 104 (Figs. 5 & 6), Allis-Chalmers HD-5 (Fig. 7), and the Caterpillar HT-4 (Fig. 8). The Eimco is mounted on a caterpillar D4 tractor and the HD-5 is powered by a General Motors two-cycle engine.

The Eimco casts its load overhead into the truck, while HD-5 and HT-4 require at least a 90-deg pivot to line up with the truck to dump or it is necessary to jockey the truck into position. Pivoting the cat is favored as too many large, sharp boulders cause excessive tire wear. Both the HD-5 and HT-4 are better adapted for sludging bottom and windrowing scattered muck although the pad wear is higher on these types due to pivoting.

In order not to cause any misconception as to the merits of the loaders due to the costs listed, the following explanation should be offered. According to the best information, Eagle-Picher was the first to try the HD-5 in underground loading and the machine was not built nor intended to be used on such grueling work. Naturally, several failures on certain parts developed quickly. The manufacturer is replacing those parts with a new and heavier design. The composite cost of loading at all mines, using Diesel loaders and slusher drags, both cat-mounted and stationary, over a hopper for a six-months' period was 38¢ per rock ton.

Fig. 11. To reach exceptionally high backs, a 65-ft mast jumbo is used

AVERAGE OPERATING STATISTICS

	HT-4	EIMCO Average & Total of 2 Units	HD-5 Average & Total of 13 Units
Days operated	39	615	1,430
Total tons loaded	12,070	151,241	257,392
Daily average	309	245	180
Best day's run	490	700	490
Total operating cost per ton		$.171	$.259

At present, a battery-powered electric truck is being converted to a low clearance truck in an effort to mine some of the upper beds that are not over 7 or 8 ft thick. A small Diesel engine direct connected to a d-c generator will take the place of the batteries, and great hopes are held that this will be successful and permit economical mining of these beds.

High Mast Jumbo Used

Several mines were found to have considerable high ore. The roof and building scaffolds using 30 or 40-ft posts were not satisfactory. The first jumbo built had a telescoping mast that raised to a height of 35 ft (Figs. 9 & 10). This unit would climb the muck pile some 25 ft high and drill out in short time. Recently more ore was found in the roof and the limit of the 35-ft mast was reached. A jumbo was then built that extends to 65 ft (Fig. 11). It is working far better than anticipated.

Discussion

J. H. East, Jr. *(Director, Region IV, U. S. Bureau of Mines, Denver):* It is my personal opinion that adding oxygen to the exhaust has nothing more than a psychological effect. A study of the analyses of samples taken by Bureau of Mines men at Mr. Clarke's operations reveals that in many instances the oxygen has reduced the carbon monoxide; but it has not helped the oxides of nitrogen which are just as dangerous and hazardous as carbon monoxide. As a strong advocate of the use of Diesels in mining operations, I do not wish to be misunderstood in talking about the dangers of the Diesel. If oxygen helps conditions in Missouri and in the Tri-State, with the authorities and with labor, oxygen should be used.

Ventilation is essential where Diesels are run. The majority of people, when they talk about a Diesel, think of a truck going up a long hill and see the trail of smoke coming out

(*Continued on page* 84)

General view of the mine site

Starting twin tubes at mine portal

Transportation Problem Solved At New Weirton Mine

In Planning the Development of a New Coal Property, the Weirton Steel Co. Solved a Difficult Transportation Situation by Pioneering a Two-Mile Belt Conveyor Having a Single Drive

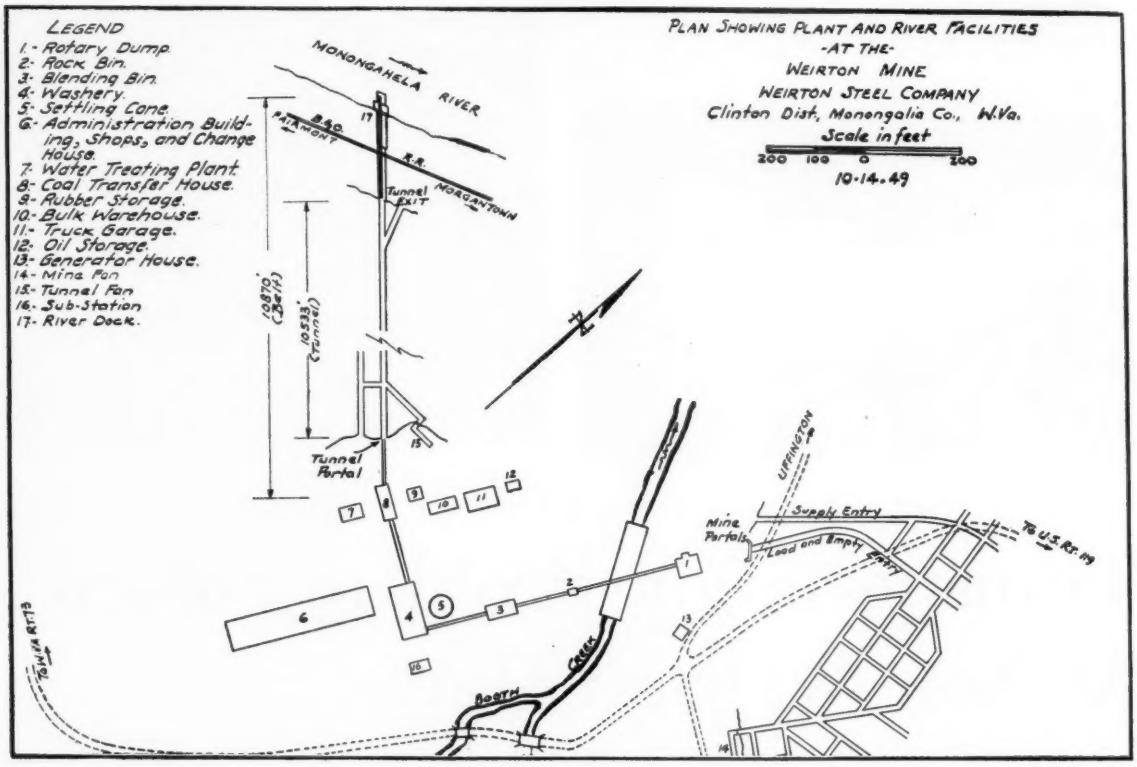
By C. W. THOMPSON
Assistant Manager
Weirton Coal Co.

A NEW mine of the Weirton Steel Co. situated on the Monongahela River about eight miles south of Morgantown, W. Va., is preparing to go into operation early in 1950 following the completion of a comprehensive construction program. This mine will develop an 8000-acre tract of the upper Freeport seam—a coal of high metallurgical quality which will be converted into coke for steel manufacture at the by-product ovens of the company at Weirton, W. Va. Transportation from the mine will be largely by river, down the Monongahela to Pittsburgh and thence down the Ohio to destination, although rail transportation will also be available by the Baltimore & Ohio. The plant is designed for an ultimate capacity of 6000 tons of clean coal per day of three shifts.

General Plan Requires Long Conveyor

In this part of the state the topography is quite rough; the seam lies above drainage, outcropping on the hillsides, thus access by drift openings is feasible. The coal is of variable height and the property has a large acreage where the thickness is plus 36 in.; however, the minable area does not extend through to the river and the railroad, but lies about two miles back. This situation created a problem; the location of the mine, as well as the location of the tipple for barge and rail loading were more or less fixed, but between these two points there was a two-mile gap that

Plant end of tunnel with piers for conveyor line already set



had to be bridged. Several plans were considered, and as the terrain at the river is a steep hillside, the final decision was to have the surface at the main mine portal—a drift opening into the seam on Booths Creek. This place, although quite a distance from the railroad, had several factors in its favor—it adjoined the minable coal area, it had adequate level ground for a plant site and was accessible to a state highway. Accordingly, the service center was constructed here—an administration building containing offices, shop and supply house, lamp and wash house, a coal cleaning plant, and a large parking lot for autos. There is no company town—no store or miners' dwellings—but the service center is reached from the state highway by a blacktop county road, providing convenient travel for men living in nearby communities and for truck supply delivery.

Several methods were available for transporting coal from the preparation plant to the river and railroad tipple, two miles away. An outside tram road following the hill contour would have been difficult and expensive to build and operate and would have been four miles long, and after taking everything into account, the decision of the company was to drive a tunnel through the hill. This tunnel is two miles long and will have a belt conveyor for coal haulage and also a mine-car track for maintenance and inspection of the belt conveyor and tunnel, and for delivery of maintenance supplies to the river tipple. Construction on the tunnel was started in March 1948, at the service center portal and later, in March 1949, at the river end. Progress has been rapid and the connection was made on September 17, 1949.

In the tunnel a belt conveyor in a single unit 10,900 ft long, from head to tail pulley, will be driven by one 200-hp motor, with no intermediate drive or transfers. The steel cord belt, designed especially for this installation, will be furnished by the Goodyear Manufacturing Co. It will be 30 in. wide and, at a speed of 300 fpm, will carry 220 tons of coal per hour. The complete assembly of drives, pulleys, frames and rollers, will be furnished and installed by the Link-Belt Co. The concrete foundations, including those for the conveyor frame standards in the tunnel, are built by the Weirton Co. These foun-

Broken rock was loaded with a conventional coal loader

dations and anchor bolts must necessarily be set with extreme accuracy both as to grade and alignment.

Rock Tunnel Driven on Grade

Original plans called for driving the tunnel in the upper Freeport seam. But shortly after starting work it was found that the seam had such radical changes in height and grade that to follow it would have been impracticable. The tunnel, therefore, was driven on a predetermined grade, regardless of whether this came in, above, or below the seam. Consequently there is a considerable variation in the rock strata encountered, which ranged from soft to hard shales, slate and some sandstone.

Starting on outcrop at the plant site, the tunnel was first driven in the coal as a double entry according to usual mine practice for ventilation. After proceeding a distance of 600 ft, it became evident that the most economical method would be to drive the tunnel through the solid rock on its proper grade line and only a single entry was worked. This entry was 15 ft wide to accomodate the conveyor and the supply track. The height was specified as not less than 6 ft over the rail, but the nature of the top rock frequently made it necessary to take more height in order to reach a stronger roof. For the most part, some roof timbering is required; aluminum alloy H-beams and packs are used for temporary support at the face during the loading. Permanent timbering consists of 85-lb rail crossbars with each end supported on a 1½-in. steel pin, shaped to form a saddle for the rail and placed in two 36-in. holes in each rib. No posts are needed except in a few cases where the rib rock has spalled off.

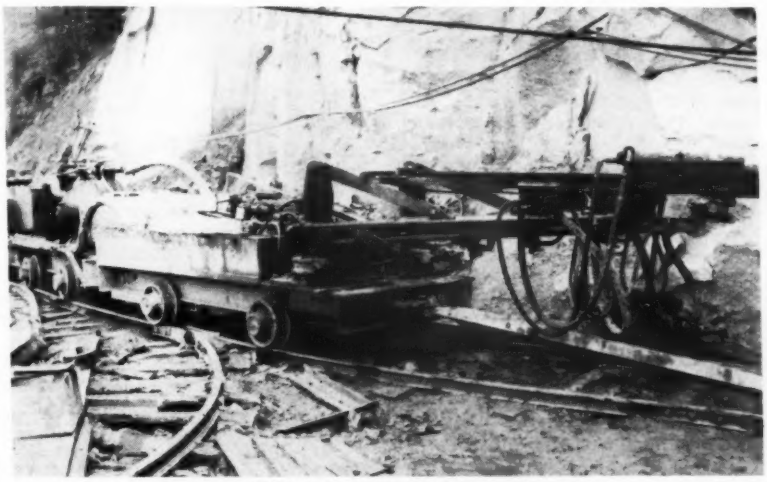
Ventilation was obtained with a 4 ft diam aerovane fan on the surface. About 10,000 cfm of air was forced into the parallel entry to the last crosscut, and thence back of a concrete block curtain wall in the single tunnel entry for an additional distance of 1250 ft. At this point the air was picked up by a centrifugal blower and forced to the face through 20-in. diam steel tubing suspended along the left rib, so as to clear track and equipment. A volume of 6000 cfm was obtained at the face.

Both the blower and tubing were removed after the tunnel was holed through. Any necessary ventilation will be handled by the aerovane fan on the surface. Air will be forced back of the ventilation wall to a point 1850 ft inby the plant end of the tunnel in severe cold weather to warm the air before it passes over the belt conveyor. An air lock will be installed at the plant end of the tunnel so that it will be possible to force the warm air out the river end of the tunnel.

As the strata was too hard for any method of chain coal cutting, the tunnel was advanced by drilling and blasting. The drill jumbo was a self-contained track-mounted compressed air unit, complete with two motors, two compressors, and two rock drill heads. The assembly was developed and built locally. Tungsten carbide bits were used. Drilling water was supplied from a 1000-gal trailing tank car.

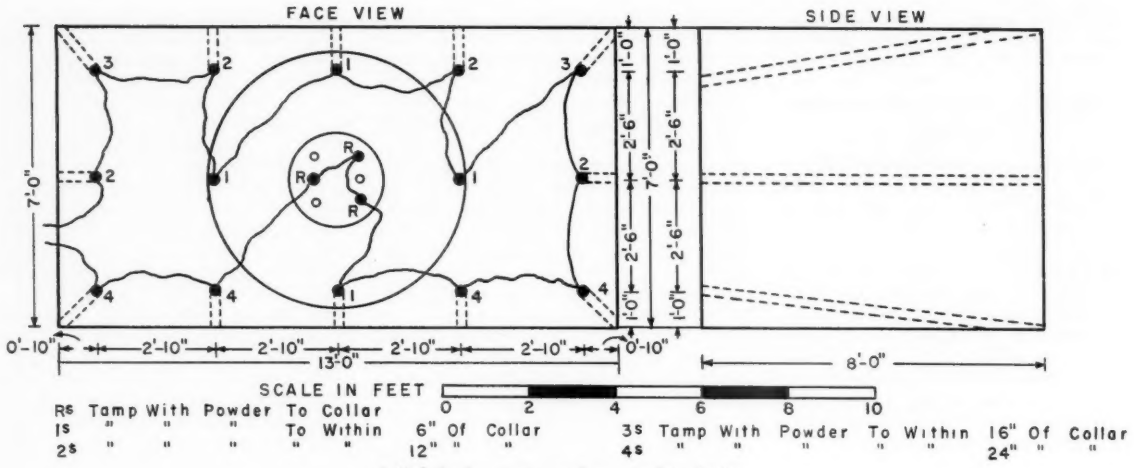
The number of holes in a round varied from 18 to 26, according to the character of strata and were drilled 8-10 ft deep. The burn-cut blasting pattern was employed—three or sometimes four center holes as the "burn," followed by the top, rib and bottom holes in sequence. Gelex dynamite with electric detonating was used for blasting. When the shots were fired, the crew retired to a fresh air chamber located in the fresh air current 200-300 ft back from the face, and closed off by a curtain. After blasting, the men stayed in the shelter hole until the smoke cleared, receiving fresh air from the steel ventilation tube through a valve and pipe into the air chamber. The tunnel inby to the face then had fresh air and work could be resumed. This shelter hole eliminated the necessity for the crew to travel to the outside while the shots were being fired and as three or more rounds were usually completed in each working day, the time saving was appreciable.

All equipment was track-mounted. After blasting, the rock was loaded by a Myers-Whaley shovel into steel, drop-bottom mine cars. These cars, although originally designed and first used for coal loading, were suitable



Drill jumbo used in driving tunnel

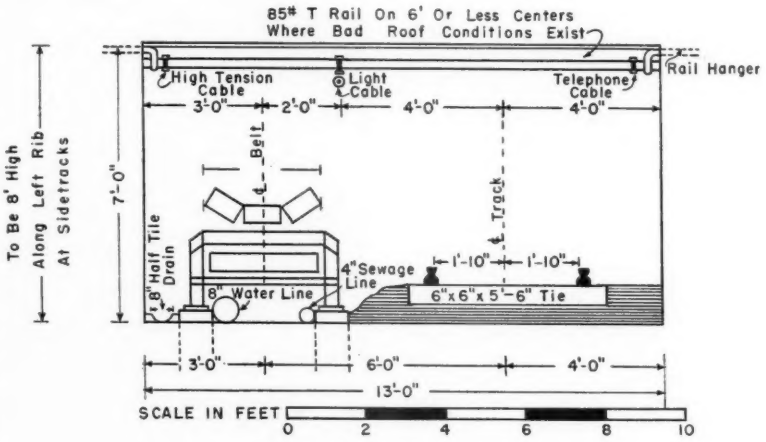
Drilling out a burn-cut round in the Morgantown tunnel



A 20-hole, burn-cut round was used in driving

for rock work, and held about three tons. Each round broke about eight cars of rock. A 12-ton electric locomotive served the loader, shifting loads and empties to a nearby side track. This side track was usually about 100 ft long and was moved ahead periodically as the tunnel advanced. Normally a crew of five men was employed on a shift in drilling, blasting, timbering, loading and hauling.

The tunnel, driven from both ends, connected 2900 ft from the river portal. On each end, the working procedure followed the methods described, except at the river end the tunnel is only 13 ft wide and was not widened for side tracks inasmuch as the equipment used was narrow enough to permit passing in the entry as driven. The average grade is minus 1.1 percent from the mine to the river tipple, but a uniform grade was not possible. About 2000 ft in from the river there is a deep ravine. There it was necessary to drive a 1¾ percent downgrade from the river portal. A cover of 80 ft remains between the roof and the creek bed. From the plant-site portal to this point, the distance is about 8500 ft and on a minus 2 percent grade; an emergency pump will have to be installed at the bottom of the dip in case any water should break through into the tunnel. So far the water encountered in driving has been negligible.



Details of the Weirton tunnel

Service Center

The surface plant site is in a valley about one-quarter mile wide. There are, of course, irregularities in the ground, but these are being filled with mine waste to make sufficient level space for automobile parking and various other plant uses. As all employes will enter the mine portal at this point, and as all will drive to work by automobile, a large parking place is essential. Booths Creek flows through the center of this valley and as it has quite a large watershed from the surrounding hills, flash floods are not unusual. In fact, during the early construction period, one of these threatened for several hours to destroy a considerable portion of the work which had already been done. The creek, however, is now "tamed" and confined to its channel by retaining walls and a large concrete arch culvert 40 ft in diameter. All power cables are laid underground. Landscaping with some trees and lawns is on the agenda for the future.

Construction at the service center is thoroughly modern in every respect. The administration building is a large brick and steel structure built on the ground floor. It contains the superintendent's office, payroll department, engineers' office and drafting room, mine foremen's office, together with their private shower and dressing rooms, and a conference room for staff meetings. Back of the offices in the same building is the lamp room and the miners' change and shower room, complete with the most modern sanitary facilities. Beyond is the supply room and the machine shops equipped for light and heavy repairs, even for rebuilding any of the machines should occasion demand.

Separate from the main building is a specially constructed room for conveyor belt storage. This has a floor area of 24 by 30 ft and is 12 ft high, with concrete walls and roof that will be covered with earth for insulation to maintain a constant temperature in the interior of the room. A specially constructed crane and roller is provided to roll the belts for storage and to handle them in and out of the room. This is a rather unusual belt maintenance feature, but because the company will use many conveyors underground, it is essential to keep belt maintenance cost low. Past experience has shown that proper storage, at a constant temperature and protected against moisture or

other deteriorating agents, is a real factor in lengthening belt life.

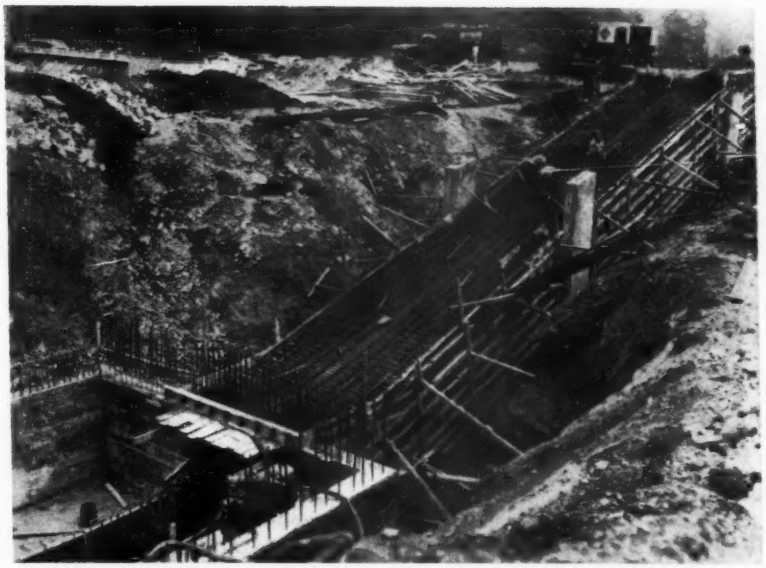
Water for all plant use will be pumped from the Monongahela River. An 8-in. cast iron pipe will be laid through the tunnel, discharging into a 350,000-gal storage tank. Raw water from this tank will provide make-up water for the cleaning plant, water for fire protection, and will also supply a complete water treating plant. After treatment, the water will be pumped to a 50,000-gal tank located on the hill above the plant site, giving adequate pressure for all needs.

Mine and Preparation Plant

The main mine portal is a drift opening with a double entrance—for loads and empties. At its location the strata overlying the coal, as well as the seam itself, had been eroded and replaced by washed material. Tunnelling through this would have been a difficult job, so the method used was to make an open cut from the toe of the bank back to the point where the cap rock above the coal had sufficient strength to form a roof. This was a distance of 180 ft. Two circular 12-ft diam, corrugated iron culvert pipes were set in the cut to serve as the portal. After placing the pipes, a concrete double portal and retaining wall was built as a facing at their outside end which were then covered over with the earth that had been originally removed to make the cut. The bottom of each pipe was filled with broken rock, built up to a point about 3 ft below its center line to form the sub-grade for the mine track. This type of construction appears to be practicable as well as economical.

Plans for the underground operation are still in formation. The operation will be 100 percent mechanized. In all probability more than one type of loading machine will be required. However, it has been decided that the underground transportation will be a combination of shuttle cars, belts, and mine cars—shuttle cars for service haulage at the face, belts for gathering and intermediate haulage, and mine cars on the main line. These cars will be of 15-ton capacity, steel construction, with eight-wheel trucks, furnished by the Differential Steel Car Co. The main line will be operated by electric locomotive; the track will be 44-in. gauge, laid with 85-lb rail and welded joints.

Immediately outside the portal, the cars will pass onto a rotary dump. Underneath the dump bin, a feeder will pass the coal through a crusher and thence onto a belt which will elevate the coal to the top of a steel structure where it will transfer to another conveyor leading to a 2000-ton blending and storage bin. The transfer point is placed immediately above a slate bin of steel construction and 100-ton capacity. There mine refuse will be diverted. The waste material will be taken by trucks from the bottom of this bin to the slate disposal.



Placing re-inforcing steel in the ramp at the rotary dump, and pouring concrete

Coal from the blending bin will be delivered to the preparation plant constructed by Link-Belt Co. The coal will be washed in Baum jigs and dewatered by screens and Bird centrifuges. All the coal prepared here is for metallurgical use and the entire product is shipped without sizing. Coal from the cleaning plant will go onto the main tunnel conveyor, which will take it on the two-mile haul to the rail and river loading station.

At the river tipple there will be no facilities for screening or cleaning, but only for loading the run-of-mine coal into river barges or railroad cars as it comes off the belt.

Editor's note: This article will be followed by a description of the mine operation and coal cleaning process after the mine is in production.

Loading the burn cut in preparation for blasting

E. R. Price
National Chairman, Program Committee

Cincinnati

Site of 1950 Coal Convention

Plans Now Under Way for Comprehensive Spring Meeting

IN 1950 the Coal Convention of the American Mining Congress will be held at the Netherland Plaza Hotel, Cincinnati, April 26-28. Plans for this three-day meeting are already under way with E. R. Price, manager of coal properties, Inland Steel Co., Wheelwright, Ky., as National Chairman of the Program Committee. Under his leadership a group of well-known operators and equipment manufacturers, who represent all fields and branches of coal mining, will bend their combined efforts to the task of formulating a program that will maintain or surpass the high standards set by conventions.

Wide interest in the coming meeting is already being evidenced throughout the coal mining industry. Many suggestions have been submitted for subjects to be discussed at the sessions and the Committee recently met at the William Penn Hotel in Pittsburgh to incorporate these recommendations into a program that will reflect the spirit of progress that has long characterized coal mining.

Papers and discussions by practical men—operators and manufacturers—will present a comprehensive cross section of industry thinking and what solutions are being found to solve its major problems. Important phases of deep and strip mining in flat and pitching seams will be covered by descriptions of modern anthracite and bituminous methods, with the current trends toward new machines and new mining practices coming in for special attention.

As the program develops, complete details will be announced in MINING CONGRESS JOURNAL and by special mailings to the industry, giving subjects of the papers, authors, discussion speakers and other information.

Those who plan to attend the 1950 Coal Convention are urged to make early hotel reservations.

Program Committee

C. B. BATON, Geo. S. Baton & Co.
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Rock Drilling Progress at Holden

—Great Northern Railway.

Inaccessible Holden is serviced by a combination of rail, water, and road transport. Unloading concentrates at lower end of Lake Chelan

Percussion Drilled Long Holes and Carbide Bits Prove Efficient

By JOHN J. CURZON

Manager, Chelan Division
Howe Sound Co.

ALTHOUGH the existence of mineralized ground in the Lake Chelan area has been known since 1887, intensive development of the Holden mine did not begin until 1937, or 50 years later. Production began in 1938 and has been maintained steadily ever since, except for a six-weeks' strike in 1939 and an eight-months' shutdown of the mill during 1946 and 1947 to permit the mine to catch up on development work which had lagged far behind during war years, due to manpower shortages.

During this time, several major changes in mining methods were made, partly through necessity, but chiefly because of advanced thinking and the availability of better equipment. Originally, all ore breaking was done by powder blasting, or underground coyote hole shooting, and all ore drawing was done by bulldoze chambers and wing raises feeding into main ore passes. As a result of experiments begun in 1940, ore breaking by diamond drill blastholes had completely replaced powder blasting by the end of 1944. Similarly, a change-over was made from bulldoze chambers to slushers during 1943. Full descriptions of these methods and changes, together with illustrations, have been published in MINING CONGRESS JOURNAL, March 1941; AIME Transactions, Volume 163, 1945; and U. S. Bureau of Mines Information Circular 7448, June 1948.

Minor improvements are being made in all phases of underground operations from time to time, but the most noteworthy development made recently has been the elimination of diamond drills for drilling blastholes for ore breaking by a combination of percussion drills, sectionalized steel, and tungsten carbide insert bits. A good description of the equipment used and results obtained during this change-over was published in the March 1949 issue of *Mining Engineering*.

The ore in the Holden mine occurs as a replacement deposit in a highly metamorphosed series of sedimentary rocks, mainly gneiss and schists, in a shear zone several hundred feet in width and of undetermined length. Commercial minerals are chalcopyrite, sphalerite, gold and a little silver. During the period of mineralization much silicification took place, thus giving the ore and surrounding country rock an abrasive drilling characteristic. The geology is further compli-

cated by the presence of numerous dikes of granitic composition, varying in width from a few inches up to 80 ft. These dikes followed the period of mineralization, and, in turn, were followed by much younger, fine-grained basic dikes usually not over 2 ft in width.

Abrasive Rock Creates Problems

The abrasive character of both ore and country rock has created two major rock drilling problems: first, drilling regular development rounds; and second, drilling long holes for ore breaking.

As a yardstick for judging drilling characteristics of the Holden rock, a 3½-in. drifter operating on 85-87 lb of air will average about 6 in. per minute in a 7-ft hole beginning with a 2¼-in. starter. Life of an ordinary carbon steel bit will average around 18 in. of drilling.

In drilling regular development rounds, improvement in performance has been brought about through successive steps using conventional steel, threaded detachable bits, one-use Craig detachable bits, and most recently, tungsten carbide insert bits.

In 1937 and 1938, when the property was being brought into production, custom called for lugged shank steel with 2½-in. starters and ⅛-in. changes. During 1939, drills were changed from 1⅛-in. round lug front heads to 1-in. hex, anvil-block front heads. This resulted in an appreciable saving in drill maintenance and labor in forging shanks. At the same time, the size of starters was reduced to 1 15/16-in. and 1/16-in. changes were successfully adopted. One-inch hexagonal steel was then standard and an average of 50 tons of drill steel in circulation were required.

Experiments begun in 1939 and continued in 1940 resulted in the adoption of Timken Type M detachable bits. During the year of transition, 1941, conventional steel was averaging 1.5510 ft per bit while detachable bits were averaging 1.8069 ft per bit. By 1942, Timken Type M bits, 2-in. starters, 1/16-in. changes, and 1-in., quarter-octogan steel had become standard. Footage per bit averaged 1.8682 and tonnage of steel in circulation was decreased to 26, or 52 per cent of the total needed in 1939 and 1940, when all drilling was done with conventional steel.

Some work was done in 1942 testing a C. & R. bit of local design and manufacture, but results were not as good as those attained by Timken bits so the project was dropped.

During 1943, successful experiments with Craig bits, a one-use bit from Canada, resulted in their adoption because of increased drilling speed and reduced steel shop personnel, an important factor during a period of manpower shortages. Craig bits recovered from the mine were used to replace grinding balls in the regrind circuit in the mill. By 1944, Craig bits in sizes ranging from 1¾-1 7/16 in. in 1/16-in. changes were in full use.

The factor of feet drilled per drilling hour was increased by the faster drilling Craig bits to 17.6 ft per drilling hour in 1944, compared to an average of 16.3 ft per drilling hour during the three previous years. The best figure ever attained for Craig bits was 19.8 ft per drilling hour during 1945. The steel shop crew was reduced to one man at that time.

Experiments with other type bits were carried on during 1945 and 1946, also the use of smaller gauges and smaller steel was tried. Nothing was found to be better than the then current combination of Craig bits and 1-in., quarter-octogan steel.

In 1947 new ideas began to be tried, including hard surfacing Craig and other type bits with Stoody borium and preliminary tests with Carset jackbits. Hard surfacing with Stoody borium indicated that a bit might be developed that had better drilling qualities than a Craig bit with an indicated saving in cost per foot. The Carset bits gave excellent drilling performance but high initial cost per bit prevented their adoption at that time. A new line of thinking was developed, however, that certain savings in drilling, which could not be based on per foot bit costs alone, might be gained by the use of this bit.

Craig bits remained standard during 1948 with an average of 1.9618 ft per bit for 424,062 ft drilled. Other bits were tried, but none proved superior to the Craig. One important step taken during the year was the adoption of aluminum alloy shells, 48 in. long. These shells made it possible to drill a hole with two steel changes instead of three. This reduced the time to drill a round and resulted in better footage per bit.

Tungsten Carbide Bit Tests

Early in 1949 full scale tests began, using 1½-in. and 1¾-in. Carset bits in regular drift rounds. The 1½-in. bits resulted in good penetration rates with small gauge loss, but difficulty was found in getting the bit studs to stay tight. The 1¾-in. Carset bits gave no thread trouble, but their penetration rates were much slower and gauge losses were greater.

As drilling advantages for the tungsten carbide insert Carset bits were quickly apparent, attention was directed toward solving jackstud troubles and a number of tests using various heat-treating procedures were tried. Drilling tests underground revealed that the method developed in our steel shop by Joe Short, steel shop foreman, gave over twice the rod life as attained by rods treated in the way prescribed by the bit manufacturer. The "Short" method was adopted and has been developed to the point where a complete jackstud connection is now being made in the steel sharpener.

Carset jackbits were adopted for general mine use on April 1, 1949, and by June 1 had completely replaced Craig bits in all headings. Based upon actual tests under operating conditions, increased drilling speeds enabled readjustment of bonus prices.

In the old days, a miner would require all day to drill out a heading. The new combination of automatic drills and insert bits make it possible today to drill out 1½ rounds or better during the same length of time with much less physical work on the part of the miner. The importance of eliminating lost time in mucking cycles becomes apparent as drilling speed increases.

Considerable difference of opinion apparently exists over relative merits of carbon steel and alloy steel. Actual tests have shown that jackstud connections gave superior performance in carbon-steel rods while the fatigue life of alloy steel was found to be much longer. The present thought is to stay with carbon steel.

Long Feeds Lower Costs

With the use of long shells and Carset bits firmly established, the next step in our research program was to try a jumbo equipped with two automatic drills on 8-ft chain feeds. Excellent results were obtained and 7-ft rounds were drilled out in 1½-1¾ hr in a 7 by 7-ft drift, including setting up and dismantling time. This combination of equipment means that from two to three rounds can now be drilled out within the same period of time needed to complete one round a few years ago. Because of this increased drilling speed, bonus prices for drifting with this type of jumbo can be readjusted.

Competitive tests have been run using carbon and alloy steel on the jumbo. Results were the same as attained in standard airplane setups, which were that carbon steel provided better jackstud connection life, but alloy steel showed far better fatigue life. Until more definite conclusions can be drawn, carbon steel will continue to be standard on long-shell jumbos.

Rock drilling performance using 3½-in. drifters in development headings is summarized in Figs. 1 and 2.

Several trends are shown by Fig. 1. Diameters of holes drilled have decreased while average penetration rates have increased. Tons of steel in circuit, which is important from the standpoint of nipping costs, has decreased materially. By giving credit for footages actually drilled, a substantial increase in feet drilled per ton of steel in circuit is apparent. As performance figures for Carset bits

STEEL USED							AVERAGE PENETRATION FOR 7' HOLE	
DATE	TYPE BITS	SIZE	STARTERS	CHANGES	TONS IN CIRCUIT	FEET DRILLED PER TON	INCHES PER MINUTE	FEET PER DRILLING HOUR
1937-38	Conventional Steel	1 1/8" Round	2 1/4"	1/8"	No Record	No Record	6	No Record
1939-40	Conventional Steel	1" Hex	1 15/16"	1/16"	50	No Record	8	No Record
1941-43	Timken	1" Q. O.	2"	1/16"	26	2,742	7.4	16.3
1944-48	Craig	1" Q. O.	1 3/4"	1/16"	10	3,333	10	17.4
1949 (4 months)	Carset	1" Q. O.	1 1/2"	1/32"	6.5	4,942	18	21.8

Fig. 1. Bits and steel used—1947 to 1949, inclusive

are based on only two months' work, June and July, an improvement in feet per drilling hour is expected as the miners become more experienced in the use of insert bits. For instance, during the first half of August, feet per drilling hour had increased to an average of 23.1.

Ten years or so ago, the importance of rock drilling was not realized to any great extent by the mining industry. Our property was no exception and adequate records were not kept of important items such as feet drilled and footage per bit. This point is illustrated by Fig. 2. From 1941, on, however, as interest in detachable bits increased, the need for more adequate and accurate drilling records became apparent. By 1945 the importance of rod costs and performance began to be realized and steps were taken to record rod data as well as bit data in permanent records.

Percussion Drills for Long Holes

The second major drilling problem at the Holden mine has been long holes for ore breaking. As mentioned previously, diamond-drill blastholes had completely replaced powder blasting by 1944. At first, $1^{3}/_{16}$-in. diam. holes were drilled with BH plug type bits. Factors of four tons per lineal foot of hole were attained with 6-ft burdens. Holes were limited to 70 ft in length, as they began to wander when drilled to greater depth. All kinds of systems were tried, including the Aldermac method, parallel holes from benches; Noranda method, rings from both hanging wall and foot wall drifts; a Holden method of flat holes from raises at each end of a stope; and various combinations of all three. The Noranda method was finally determined to be the best from all standpoints, including safety.

Experiments begun in 1947 using AX bits, $1^{15}/_{16}$-in. diam, showed that factors of eight tons per foot of hole could be attained in standard rings with burdens up to 8 ft. Accordingly, all rings were layed out for AX holes including undercuts and slots. Over-all figures for 1948 resulted in factors of 4.59 tons per foot of hole blasted and 126 lb of powder per ton broken including all stopes, slots and undercuts.

The rapid increase of diamond drilling costs during recent years indicated the need for changes in mining methods. As a result of the preliminary tests using $1^{1}/_{2}$-in. tungsten bits in development headings in 1947, attention was naturally turned toward the possibility of adapting insert bits and sectionalized steel for drilling long holes with percussion drills. Accordingly, testing was begun using $1^{1}/_{2}$-in. bits with 1-in. Q.O. chuck pieces and $^{7}/_{8}$-in. Q.O. sectionalized steel; this small size being necessary because of the limited diameter of coupling that would operate in a $1^{1}/_{2}$-in. diam hole.

When 2-in. tungsten carbide bits became available in early 1948, test work was begun immediately, as that size more nearly equalled the AX holes then being used for blastholes. No change would then be required for ring patterns, burdens, or explosives. Larger couplings were permitted and it was necessary to use heavier $1^{1}/_{8}$-in. round steel. With heavier couplings and steel, heavier machines proved feasible and, as a result, 4-in. drifters were adopted as standard.

By the fall of 1948, holes up to 40 ft in depth were drilled without difficulty. This amounted to about 35 percent of the drilling in each stand-

	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
CONVENTIONAL STEEL												
Feet Drilled	No Record	No Record	No Record	339,061	8,166	14,253	2,514	25,696	2,247	—	—	—
Sharpenings	323,391	497,959	676,019	257,294	9,068	8,351	1,907	13,788	5,826	642	—	—
Feet Per Bit	—	—	—	1.5510	1.6112	1.7067	1.3183	1.8636	.3855	—	—	—
TIMKEN TYPE M BITS												
Feet Drilled			No Record	643,318	686,671	231,792	1,732					
Number New Bits			No Record	93,785	86,270	38,700	—					
Bits Sharpened			67,175	372,947	281,288	105,100	—					
Uses Per Bit			—	5.0	4.3	3.7	—					
Feet Per Bit Use				1.8069	1.6632	1.6118						
C & R BITS (COMPANY MADE)												
Feet Drilled					70,354							
Bits Made					11,722							
Bits Sharpened					42,069							
Feet Per Bit Use					1.3079							
CRAIG BITS												
Feet Drilled						373,249	517,173	169,030	226,847	630,504	424,062	166,016
New Bits						223,700	287,450	90,202	141,726	347,390	216,156	25,950
Feet Per Bit						1.6685	1.7992	1.8739	1.6006	1.8150	1.9616	2,135
New Rods						No Record	No Record	875	2,502	6,211	2,652	803
Rods Reconditioned						No Record	No Record	7,007	10,036	15,266	8,585	2,611
Feet Per Rod Use								21.4	18.1	29.4	37.7	48.6
CARSET BITS—1 1/2"												
Feet Drilled												128,494
New Bits												957
Feet Per Bit												1343
New Rods												825
Rods Reconditioned												1,938
Feet Per Rod Use												463
TOTAL FOOTAGE DRILLED	No Record	No Record	No Record	1,182,379	765,191	619,294	521,419	194,726	229,094	630,504	424,062	294,510

Fig. 2. Drilling data—1938 to 1949, inclusive

ard ring. Longer holes were still being completed by diamond drills. Improved design of water swivels and drilling technique enabled holes up to 70 ft to be successfully drilled early in 1949, thereby eliminating the diamond drill entirely except in special cases where longer holes are required.

When this program began, bits were taken out of the circuit as soon as one insert was lost or the gauge had dropped below $1\frac{13}{16}$ in., which was the smallest diameter a hole could be drilled to be loaded with $1\frac{3}{4}$-in. powder. All discarded bits were returned to the warehouse, just in case some future use could be found for them.

As work progressed, it became evident that a bit with only three inserts intact would still drill. To prevent a partially broken insert from coming loose and damaging good inserts, the broken insert was ground down to prevent contact with the rock. Now these reclaimed bits are being added to the circuit gradually, together with new ones.

Insert Bit Results

Since the use of 2-in. tungsten carbide bits for long holes began in July 1948, a total of 72,027 ft of drilling has been done by 647 bits for an average of 113.2 ft per bit. Of this total of 647 new bits issued, 205 were removed from the circuit because of the failure of one insert. One hundred of these bits have been returned to the circuit and the remaining 105 will be used up gradually. Thus, the figure of 113.2 ft per bit should be increased as additional footage is obtained from bits formerly discarded; also new bits are now averaging 120 ft or more before failing.

Experience has shown that bits that have two inserts left on opposite sides will still drill. The same thing applies to bits that have been reduced in gauge below the minimum of $1\frac{13}{16}$-in. diam required for long holes. A total of 155 bits in this class have been recovered and will be used up to advantage in regular development headings or in other special work.

Footages drilled per machine shift during June and July 1949 averaged 66.3 ft. The highest record attained in one day was 133 ft per machine shift. Diamond drills averaged about 28 ft per machine shift; the highest footage of AX holes made in one shift was 50 ft. These figures clearly show that percussion drills are superior to diamond drills in output per machine and in saving manpower. Cost per foot for holes drilled with percussion drills average about 25 percent of the former cost using diamond drills.

The successful application of tungsten carbide bits to long holes was not due to the efforts of any one particular person, but was the result of most excellent teamwork between the engineering staff, mine bosses and miners on the machines during the experimental program. Much credit is due all of these men for developing a system which will become an important factor in the future of the Holden mine.

Wide Application for Percussion Drilled Long Holes

Many other uses besides ore breaking may be found for percussion drilled long holes. For instance, several years ago, our No. 2 shaft, rock section 14 by 21 ft, was sunk a considerable distance by diamond drilling down holes around a previously driven pilot raise. These holes were then loaded and shot in segments ranging from 12 to 25 ft. Even with the small size BH and EXE holes used at that time, $1\frac{3}{16}$-in. and $1\frac{7}{16}$-in. diam respectively, this experiment was successful. Costs were not out of line and a distinct saving in manpower was accomplished. The greater drilling speed and less cost per foot for percussion drill holes of larger diameter would make this scheme even more successful today.

Reaming tunnels and cutting excavations such as hoist rooms, stations, and ore pockets with diamond drill blastholes has been successful in the past. The same factors mentioned above, increased drilling speed and lower cost per foot, should make the use of percussion drills for this type of work extremely attractive.

Driving raises by long holes has always been intriguing and actual tests are underway at the present time in the 312 slot raise, which is really a series of short raises between blasthole drifts. The lowest section of this raise is 69 ft long and inclined at $58\frac{1}{2}$ deg. A series of 12, 2-in. long holes were drilled originally; but as several of these holes were found to be badly out of line, six more holes had to be drilled before blasting could begin at the bottom 10-ft segment. Some difficulty was found in pulling the ground because of the uneven pattern of the holes near the bottom of the raise. However, even with all the troubles caused by the holes being out of line, final costs should be near the costs of a similar raise driven by conventional methods.

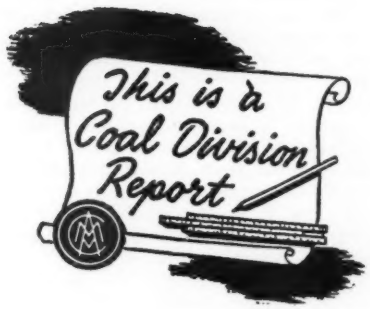
The section of raise immediately above is only 55 ft long and inclined at 73 deg. Before drilling begins, a slab of concrete will be poured on the drift floor so that each long hole can be collared correctly and drilled at just the right direction and inclination. This section of the raise will have a better chance to show lower costs because the raise is shorter and steeper and better control will be attained during the long hole drilling cycle.

Another possibility is the driving of small openings for special use, such as stope filling, pipe lines, cable ways, or access points for bombing hangups in ore passes. Experimental work was done recently in the stope filling program, where three connections averaging 48 ft each were made from a main haulage drift to an open stope, clearly proved that the scheme would work if the holes were spaced and drilled correctly, and the blasted material would clear itself from the far end of the opening.

Coming off shift at the Holden mine —Great Northern Railway.

Rapid strides have been made in the science of drilling work during the last few years and further improvements in machines and bits will undoubtedly be made in the future. In the meantime, mine operators should study their mine problems and apply new ideas at every opportunity. Events during the last decade have certainly shown that mining is a progressive science, and that continued success and survival in some cases can only be attained by a progressive attitude on the part of each individual operator.

Power Costs for Mine Haulage



A Report of the Power Subcommittee Showing Methods of Estimating the Cost of Installing, Maintaining and Operating an Underground Power System with Either Track or Belt Conveyor Haulage

J. O. CREE, Chairman
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THE report submitted here may be considered as an addition to the several reports on mine transportation system with track and with belt haulage that have been prepared jointly by the Haulageroads and Conveyor Committees and published in MINING CONGRESS JOURNAL.* The same assumptions have been used for haulage distances, grades, seam thicknesses and similar factors for investment, maintenance and labor costs. The mine production is to be 1200 tons of coal per shift—1000 tons from the track equipment by the Haulageroads Committee, but that no power circuit data has been given by the Conveyor Committee. Therefore, this report will consist of the power systems for track mines and for conveyor mines.

The conversion units, which are to provide adequate d-c power, and the a-c power circuits for the conversion units, are to be a part of each system. In order to determine the capacities required for the conversion units and power transmission circuits, the total horse power of the equipment must be known.

TABLE I

TOTAL CONNECTED LOADS

	Max horsepower Connected	Min horsepower Connected
Track mines:		
One-mile haul	2130	1490
Two-mile haul	2350	1650
Four-mile haul	2640	1820
Conveyor mines:		
One-mile haul	2060	1350
Two-mile haul	2360	1440
Four-mile haul	2780	1620

producing entry and 200 tons from the development; operating on double shift and giving an annual output of 600,000 tons.

Power circuits for face equipment are assumed to terminate at the entrance to the various rooms and *protective or isolating devices for face equipment are not* included. A review of the track and belts reports will show that the d-c power circuits have been included as a part of the

* Coal Mine Haulage, August 1947; Gathering Haulage with Belt Conveyors, January 1948; Gathering Haulage with Mine Cars, August and October 1948; Combination Rail and Belt Haulage, August 1949.

Total Connected Loads

The total connected load (Table I), or the total horse power in d-c equipment that is to be in service has been estimated by this committee. The total horse power of equipment, as given in the other committees' reports, has been used and then, from averages of present-day operating mines, this committee has assumed the

TABLE II
CONVERSION COSTS

CAPACITIES OF CONVERSION SUBSTATIONS

Face load	600 kw capacity
One-mile haulage	200 kw capacity
Two-mile haulage	300 kw capacity
Four-mile haulage	600 kw capacity

ESTIMATED COSTS PER UNIT OF CONVERSION SUBSTATION

		200 kw Unit	300 kw Unit
Investment		$26,262.00	$27,443.00
Installation		5,000.00	5,000.00
Total		$31,262.00	$32,443.00
YEARLY OPERATING CHARGES PER UNIT			
Depreciation	10%	$3,126.20	$3,244.30
Interest	3%	937.86	973.29
Supplies	2%	525.24	548.86
Maintenance labor	2%	525.24	548.86
Total		$5,114.54	$5,315.31
Cost per ton—600,000 tons		$ 0.00852	$ 0.00885

TABLE III
COST FOR A-C LINES TO CONVERSION UNITS

		With 1-Mile Haulage	With 2-Mile Haulage	With 4-Mile Haulage
Investment Costs		$10,560.00	$21,120.00	$42,240.00
YEARLY OPERATING CHARGES				
Depreciation	10%	$1,056.00	$2,112.00	$4,224.00
Interest	3%	316.80	633.60	1,267.20
Supplies or replacement	1%	105.60	211.20	422.40
Maintenance labor		64.00	128.00	256.00
Total		$1,542.40	$3,084.80	$6,169.60
Cost per ton—600,000 tons		$ 0.00257	$ 0.00514	$ 0.01029

total horse power for the face equipment and auxiliary units, such as gathering pumps, rock dusters, and air compressors. The conditions of these assumptions were:

(1) Face equipment for the 3-ft seam is assumed to consist of conveyors, regardless of the grades, with an expected production of 40 tons per face. To obtain an average of 1200 tons per shift, 30 such faces will be required at approximately 50-hp per unit of face equipment.

(2) Face equipment for the 4-ft and 6-ft seams is assumed to be mobile loading equipment with an expected production of 200 tons per shift, and each section of mobile equipment consists of a loader, mining machine and drill, along with the necessary transportation units from the face to the room neck. Each mobile section will have an average connected load of 180 hp, which should produce 200 tons per shift in the mines with the level and 2 percent grades, or a total of six sections will be necessary. For the mines with 4 percent grades, seven mobile sections have been chosen to obtain the desired production.

(3) The auxiliary equipment for the mines has been selected from average conditions which vary from 60 hp to 240 hp, depending upon the grades and distances in the track mines, and from 160 hp to 680 hp, depending upon grades, distances and equipment for supply haulage in the conveyor mines.

From the foregoing assumptions, the maximum and minimum total connected loads to be considered for all mines, which will be used for selecting the capacities of converting equipment and underground power circuits, is shown in Table I.

Conversion Substations

Permitting an operating ratio of 2.5 hp per kilowatt of conversion substation capacity for an average of the connected loads that have been shown, the substation capacities shown in Table II have been selected to provide power for haulage and face loads. The conversion units are to be spaced equal distances along the haulage roads and the conversion units are to be located not to exceed a 3500-ft maximum distance from the face loads.

Modern rectifier conversion units are considered and the investment, installation, and yearly operating costs are shown in Table II. The installation costs include the building, materials, and labor, on the assumption that this would be the same, regardless of surface or an underground installation.

These conversion substation capacities will apply both to track and conveyor mines and for the various haulage lengths and seam heights as used in this report. The per-ton costs of conversion are calculated as follows from the basic figures in Table II.

A one-mile haulage requires 200 kw and with a face load of 600 kw, the total power required for the mine producing 1200 tons per shift would be 800 kw. This can be furnished by three substations, two at 300 kw and one at 200 kw. For these substations, the conversion cost per ton coal is then applied:

2×300 kw	@	$.00885=.01770
1×200 kw	@	.00852=.00852
800 kw cost/ton is		.02622

Using the above methods, a mine with a two-mile haul requiring a total of 900 kw, would operate three 300-kw stations, each at a cost of $.00885

TABLE IV
FACE POWER CIRCUITS
ESTIMATED COST OF PANEL FEEDER LINES

Line material for 6-ft and 4-ft seams.

Material	Amt. Used	Unit Price	Purchase Cost	Times Used	Replacement Rate	Charge to Entry
Feeder copper	20,600 lb	$0.31	$6,386.00	10	10.0%	$638.60
Hangers	180	1.79	322.20	10	10.0%	32.22
Splices	36	8.50	306.00	10	10.0%	30.60
Cost for one panel			$7,014.20			$701.42
Line material for 3-ft seams.						
Feeder copper	22,000 lb	$0.31	$6,820.00	10	10.0%	$682.00
Hangers	230	1.79	411.70	10	10.0%	41.17
Splices	66	3.40	234.40	10	10.0%	23.44
Cost for one panel			$7,466.10			$746.61

WIRING COST IN A 6-ft SEAM—For All Grades.

Material cost for three panels=$14,028.40	
Depreciation at 10% and Interest at 3% on $14,028.40=$1,823.59 yearly Investment cost for annual production 600,000 tons	$0.00304 per ton
Replacements cost $701.42 for 207,360 tons	$0.00338 per ton
70 Man shifts at $8.00 is $560.00 for 207,360 tons	$0.00270 per ton
Total Cost of Wiring	$0.00912 per ton

WIRING COST IN A 4-ft SEAM—For All Grades.

Material cost for three panels=$14,028.40	
Investment cost (Same as 6-ft seam)	$0.00304 per ton
Replacement cost $701.42 for 138,240 tons	$0.00507 per ton
75 Man shifts at $8.00 is $600.00 for 138,240 tons	$0.00434 per ton
Total Cost of Wiring	$0.01245 per ton

WIRING COSTS IN A 3-ft SEAM—For All Grades.

Material cost for four panels=$15,933.20	
Depreciation at 10% and Interest at 3% on $15,933.20=$2,071.32 yearly Investment cost on annual production 600,000 tons	$0.00345 per ton
Replacement cost $746.61 for 103,680 tons	$0.00720 per ton
90 Man shifts at $8.00 is $720.00 for 103,680 tons	$0.00694 per ton
Total Cost of Wiring	$0.01759 per ton

TABLE V
SUMMARY OF POWER COSTS PER TON FOR MINES USING TRACK HAULAGE
Including Investment, Supplies and Labor

	6-ft seam	4-ft seam	3-ft seam
WITH ONE-MILE HAUL			
Conversion units—Table II	.02620	.02620	.02620
A-C power circuit—Table III	.00257	.00257	.00257
Face d-c circuits—Table IV	.00912	.01245	.01759
Total	$.03789	$.04122	$.04636
WITH TWO-MILE HAUL			
Conversion units—Table II	.02655	.02655	.02655
A-C power circuits—Table III	.00514	.00514	.00514
Face d-c circuits—Table IV	.00912	.01245	.01759
Total	$.04081	$.04414	$.04928
WITH FOUR-MILE HAUL			
Conversion units—Table II	.03540	.03540	.03540
A-C power circuits—Table III	.01029	.01029	.01029
Face d-c circuits—Table IV	.00912	.01245	.01759
Total	$.05481	$.05814	$.06328

TABLE VI

CONVEYOR MINES—ESTIMATED POWER CIRCUIT COSTS FOR MAIN AND GATHERING HAULAGE

Based on Annual Production of 600,000 Tons

	Operating a 4-ft and 6-ft Seam					Operating a 3-ft Seam				
	Level Grades	Plus 2% Grades	Plus 4% Grades	Minus 2% Grades	Minus 4% Grades	Level Grades	Plus 2% Grades	Plus 4% Grades	Minus 2% Grades	Minus 4% Grades
WITH ONE-MILE HAULAGE										
Copper @ 31¢ lb	$3,999	$4,544	$5,058	$3,546	$3,546	$5,518	$5,558	$6,072	$3,791	$4,305
Control Material	712	712	712	712	712	712	712	712	712	712
Hangers @ $1.79 ea	537	537	537	537	537	537	537	537	537	537
Splicers @ $2.20 ea	66	66	66	66	66	66	66	66	66	66
Labor @ $8.00 shift	2,400	2,400	2,400	2,400	2,400	3,000	3,000	3,000	3,000	3,000
UNIT COSTS PER TON										
Investment 13%	.00115	.00127	.00138	.00105	.00105	.00128	.00149	.00160	.00110	.00122
Supplies 10%	.00088	.00094	.00106	.00081	.00081	.00114	.00115	.00123	.00085	.00094
Labor	.00040	.00040	.00040	.00040	.00040	.00050	.00050	.00050	.00050	.00050
Total	$.00243	.00261	.00284	.00226	.00226	.00292	.00314	.00333	.00245	.00266
WITH TWO-MILE HAULAGE										
Copper	$9,560	13,020	17,484	13,020	17,484	14,880	17,670	25,885	15,810	23,580
Control material	1,324	1,324	1,324	1,324	1,324	1,324	1,324	1,324	1,324	1,324
Hangers	1,074	1,074	1,253	1,074	1,253	1,163	1,253	1,611	1,208	1,521
Splices	297	328	328	328	328	297	328	458	297	458
Labor	5,000	5,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000	6,000
UNIT COSTS PER TON	$.00554	.00686	.00865	.00686	.00865	.00777	.00889	.01222	.00849	.01130
WITH FOUR-MILE HAULAGE										
Copper	12,905	16,938	16,938	16,213	16,213	12,905	16,938	16,938	16,213	16,213
Control material	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482
Hangers	895	1,074	1,074	1,074	1,074	895	1,074	1,074	1,074	1,074
Splices	260	294	294	294	294	260	294	294	294	294
Labor	10,000	10,000	10,000	10,000	10,000	12,000	12,000	12,000	12,000	12,000
UNIT COSTS PER TON	$.00743	.00924	.00924	.00897	.00897	.00795	.00958	.00958	.00930	.00930

per ton/unit, giving a total cost of $.02655 per ton. By the same formula, a mine with a four-mile haul requires a total of 1200 kw, which would be supplied by four 300-kw stations at $.00885 each, or a total cost of $.03540 per ton of coal. The foregoing values are used in the track haulage summary of Table V and also in the conveyor mining summary in Table VII.

A-C Power Circuits for Conversion Units

These a-c power circuits to the conversion units will be the same for either the track or conveyor mines.

The factors that determine these a-c power circuits are the distances of transmitting the desired electrical load, which, in turn, dictates the voltage and conductor size. The voltage of transmission for the one-mile and two-mile mines will likely be either 2400 or 4160 volts, while a higher voltage would be desirable when the four-mile mine is considered.

Another important factor is the location of this a-c power circuit, which can be either on the surface with bore-holes for the power entrance to the mine, or a complete underground power circuit.

With a surface power circuit, the conversion unit can be either underground with cable insulating a-c power in the bore-hole, or on the surface with cable insulated for d-c power in the bore-hole. Cable costs are assumed to be equal for either a-c or d-c power in the bore-hole.

For this report, the Power Committee has assumed that the surface power circuit and bore-holes would cost the same as an underground power circuit. The investment cost, based on a unit price of $2 per foot, has been selected, and, for higher voltage, the cost of smaller sized conductors is considered equal to the cost of additional transformers for the conversion units.

The investment cost and yearly operating costs are shown in Table III for the mines with the three distances. The unit cost of $2 per foot has been chosen as an average in order to show the method of determining the costs, and the factors which have been mentioned should be given careful consideration when an actual mining operation is planned.

D-C Underground Face Power Circuits

A power delivery of 240 v at the room neck or at the end of the power circuit, where the trailing cables of the mobile units are attached, is desirable, and when a conversion unit develops 290 v, the loss in transmission is to be considered as 50 v (Table IV). The average of two amperes per horsepower of equipment in operation has been chosen for this report in order to determine the conductor sizes when using the following formulae:

$$\text{Cir Mils} = \frac{\text{Distance} \times 2 \times 10.7 \times \text{Amperes}}{\text{Volt loss}}$$

The underground power circuits for the main entry and gathering haulage were included in the Haulageroad and Conveyor Committee's reports. Power circuits for the face power loads will be considered in this report. Those committees selected two operating panels and one developing panel for the mines with seam thickness of 4 ft and 6 ft, and two operating panels and two developing panels in the 3-ft seams. This committee will use these conditions for selecting the conductor sizes. Calculations show the conductor sizes to be:

4-ft and 6-ft seams.... 1,250,000 cir mils
3-ft seam..... 1,050,000 cir mils

Since the Gathering Haulage reports have assumed the transfer of track and trolley from the operating entries to the developing entries, this report will follow the same conditions. In order that haulage power will not affect the delivered voltage to the face equipment, negative and positive circuits are considered necessary.

The estimated cost of feeders and yearly operating costs for the 3-ft, 4-ft, and 6-ft seams of all grades are shown in Table IV. The investment cost per ton is based on an annual production of 600,000 tons while the

TABLE VII

ESTIMATED TOTAL POWER COSTS

CONVEYOR MINES—600,000 TONS ANNUAL PRODUCTION

	Operating a 6-ft Seam				Operating a 4-ft Seam				Operating a 3-ft Seam			
	Level Grades	Plus 2% Grades	Plus 4% Grades	Minus 2% Grades	Minus 4% Grades	Level Grades	Plus 2% Grades	Plus 4% Grades	Minus 2% Grades	Minus 4% Grades	Level Grades	Plus 2% Grades	Plus 4% Grades	Minus 2% Grades	Minus 4% Grades
ONE-MILE HAULAGE															
Conversion units	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622	.02622
A-C power circuits	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257	.00257
Face power circuits	.00912	.00912	.00912	.00912	.00912	.01245	.01245	.01245	.01245	.01245	.01759	.01759	.01759	.01759	.01759
Main and gathering entry power circuits	.00243	.00261	.00284	.00226	.00226	.00243	.00261	.00284	.00226	.00226	.00292	.00314	.00333	.00245	.00266
TOTALS	.04034	.04052	.04075	.04017	.04017	.04367	.04385	.04408	.04350	.04350	.04930	.04952	.04971	.04883	.04904
TWO-MILE HAULAGE															
Conversion units	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655	.02655
A-C power circuits	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514	.00514
Face power circuits	.00912	.00912	.00912	.00912	.00912	.01245	.01245	.01245	.01245	.01245	.01759	.01759	.01759	.01759	.01759
Main and gathering entry power circuits	.00554	.00686	.00865	.00686	.00865	.00554	.00686	.00865	.00686	.00865	.00777	.00889	.01222	.00849	.01130
TOTALS	.04635	.04767	.04946	.04767	.04946	.04968	.05100	.05279	.05100	.05279	.05705	.05817	.06156	.05777	.06058
FOUR-MILE HAULAGE															
Conversion units	.03540	.03540	.03540	.03540	.03540	.03540	.03540	.03540	.03540	.03540	.04326	.04326	.04326	.04326	.04326
A-C power circuits	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029	.01029
Face power circuits	.00912	.00912	.00912	.00912	.00912	.01245	.01245	.01245	.01245	.01245	.01759	.01759	.01759	.01759	.01759
Main and gathering entry power circuits	.00743	.00924	.00897	.00924	.00897	.00743	.00924	.00897	.00924	.00897	.00795	.00958	.00958	.00930	.00930
TOTALS	.06224	.06405	.06378	.06405	.06378	.06537	.06738	.06711	.06738	.06711	.07900	.08072	.08072	.08044	.08044

replacements and labor are based on the tonnage that will be produced from one panel. A standard panel has the assumed dimensions that were used by the Haulage and the Conveyor Committees:—2000 ft long with 300-ft rooms, driven to the right and the left. With an 80 percent recovery, the following productions would then be mined from a room panel: 207,360 tons in a 6-ft seam; 138,240 tons in a 4-ft seam, and 103,680 tons in a 3-ft seam.

Summary of Track Power Costs

The effect of seam height and haulage length is shown in Table V which compiles the unit costs as calculated in detail in Tables II, III and IV.

A three-wire control and signal circuit the entire length of each main entry haulage is included in the power system. No details of the control system are to be given but the three-wire circuit is to be of No. 6 conductors, and $100 per mile of haulage and $100 for gathering belts is included as the initial cost for any control devices other than those provided in the usual automatic starters of the motors.

The Conveyor Committee has specified the motor sizes to be used, and this information has been used to determine the size of power conductors.

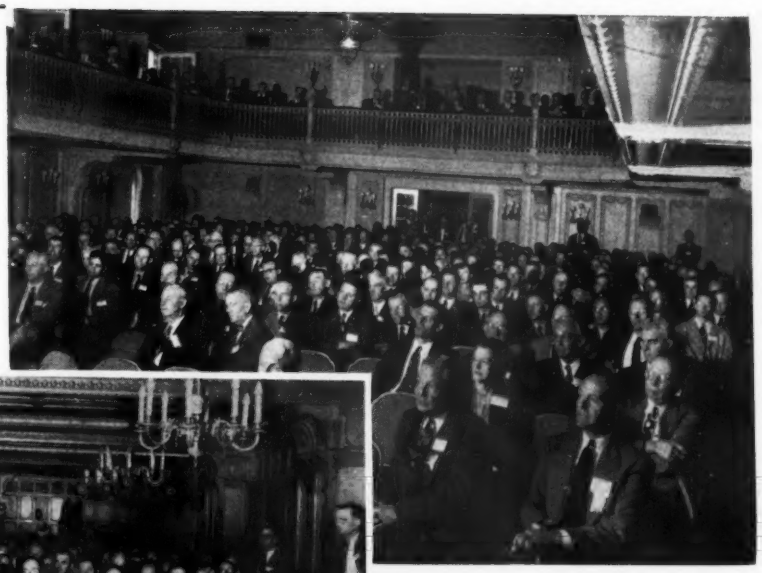
The estimated power circuit costs per ton are shown for mines with one, two, and four-mile haulage belts in Tables VI, VII, and VIII, respectively. The details are the material cost of copper for power and control circuits, hangers, and splices. The yearly investment costs are taken as 10 percent depreciation and 3 percent interest on the material cost, and the supply cost of 10 percent of the material cost. The labor cost includes the installation, maintenance, and removal over the ten-year period on a basis of producing 6,000,000 tons of coal.

Table VII compiles the costs, as calculated in Tables II, III, IV and VI.

Conclusion

In submitting this report, the Committee wishes to emphasize that the costs shown should not be applied directly to any actual operation. All estimates are based on assumptions—price and quality of material as well as mining conditions and operating performances—and it is obvious that the figures used would not have universal application even within the range of seam heights and grades specified. The purpose of the report is to show what factors must be taken into account when planning a mine transportation system and to illustrate methods of estimating installation and operating costs for belt or locomotive haulage.

Stanly A. Easton
Chairman
Western Division



Eager audiences characterized both operating and general sessions

Industry-wide Questions of Management and Production Analyzed

Spokane Meeting Highlights Mining Problems

A LARGE over-all attendance and capacity crowds at the various business sessions and entertainment functions speak for the success of the 1949 Metal Mining Convention in Spokane. A total of 1504 mining men and their ladies participated in the convention program, September 26-28. This was the third time in the 52 years since its organization that the American Mining Congress met in Spokane; first in 1912, then in 1929 and now in 1949. On each occasion, the activities of the convention have dealt in general with means of forwarding the best interests of America's industrial economy and specifically with the problems of the mining industry.

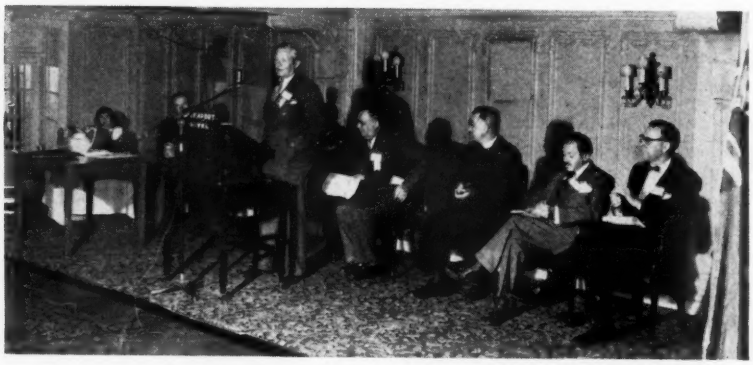
With conscious deliberation on manifold industry problems, an able Program Committee, under the general chairmanship of W. J. Coulter, developed a series of nine comprehensive sessions. Five sessions covered questions of broad general interest, and four were devoted to diverse operating problems. The general sessions explored the economic state of the industry; labor relations and mining legislation; taxation, incentives and stockpiling; the problems of the small mine operators; and public lands and the mines of the future.

Four operating sessions treated a variety of topics related to ore production. The subjects were grouped under milling progress; open-pit and conveyor mining; mechanization and improvements in mining practices; and safety and health, and nonmetallic mining.

Both the local and national committees that gave so much time and effort to bring the industry this truly worthwhile program, justly deserve the high praise extended by convention delegates. Robert M. Hardy, general chairman of the Arrangements Committee, and Roger O. Oscarson, vice chairman of the committee, were highly complimented for their fine work, along with Mrs. R. P. Porter, Ladies Committee; James McCluskey, Housing; James A. Ford, Publicity; Wray D. Farmin, Trips; and Maurice Cooper, Parking and Traffic. An active reception committee performed a splendid service in making delegates from every mining district of the United States feel welcome as they registered for the convention. Sincere commendation was earned by the many members of these committees who worked together to insure the success of the 1949 Metal Mining Convention.

Meeting Opened with Mayor's Address

Mining men began to gather in Spokane early on the Sunday preceding the official opening of the convention. Delays in registration were avoided by an efficient system of advance registration, whereby a combination registration card and badge—hand printed in large letters easily readable at a distance—was sent out before the meeting to all who had signified their intention to attend. This combination card was presented at Spokane at the registration desk where the badge insert was detached and returned to the registrant with a regular badge holder, the registration card being retained for the convention record. In contrast to the long line of people waiting to register at so many conventions, the Spokane registration deske were notably free from any congestion.



R. M. Hardy extends greetings at opening session

On Monday morning, the convention was formally opened with invocation by the Very Rev. Francis B. Corkery, S.J., president, Gonzaga University. Mayor Meehan of Spokane welcomed convention delegates and AMC President Howard I. Young responded. Marking the value of these annual meetings, Young stated "The problems that we have today have changed somewhat from those of a year ago. But it has been my experience that by getting together and rubbing shoulders with other members of the industry we find that our problems are not quite as hard as we think they are when we are in our offices debating them without the conference and help of our fellow operators. The real benefit obtained from these meetings is the fellowship that we have the privilege of enjoying and the opportunity to discuss what we think seems to be the best and most constructive program for the mining industry."

He then presented Dr. Joseph Zimmerman, the first speaker on the program and the proceedings of the convention were under way. (Summaries of all the various convention addresses and discussions appear on pages 50 to 66.)

Resolutions Presented at General Sessions

Adopting a new plan, the Resolutions Committee prepared the resolutions in advance and presented them at the close of each period of discussion at the general sessions, in order that they might be timely and that those attending the convention might participate in and thoroughly understand the policies adopted. Text of the resolutions as approved during the convention will be found beginning on page 67.

Donald A. Callahan, chairman of the committee, in forceful comment, asserted "Adopting these resolutions doesn't mean a thing unless you men and women carry them away from here and seek to do something about them. If you agree with the principles that are embodied in these resolutions, it is our part to see that those who have the enactment and administration of our laws in their hands know what we think."

Welcoming Luncheon

At the close of the first session buses were on hand to take everybody to the welcoming luncheon at the National Guard Armory. Toastmaster Stanly A. Easton praised the fine cooperative effort of the mining industry, stating, "In the 52 years since the founding of the American Mining Congress at Denver it has steadily grown into a great nation-wide organization, serving all branches of the mining industry, intelligently presenting mining viewpoints, and promoting safety and efficiency in all the phases of mining." He paid high tribute to the memories of those who participated in the other Spokane meetings of the American Mining Congress and made a special salute in remembrance and appreciation of the late James F. Callbreath.

Mr. Easton then introduced Hon. Arthur B. Langlie, Governor of the State of Washington, who spoke on the vast resources of this nation and the remarkable success that private industry has attained in bringing these rich resources to fruition to benefit all the people. The Governor's attention was particularly addressed to the proposed Columbia Valley Administration bill and its dangers to the free enterprise system. He deplored the great concentration of power, authority and economic control in Federal agencies and bureaus and asserted that we are jeopardizing the very foundation of a free society. He expressed faith in the ability of the citizenry of the country to return to the system of government on which this nation was founded.

Following the Governor's stirring address, Chairman Easton introduced Ralph W. Diamond, vice-president, general manager and director of the Consolidated Mining & Smelting Co. of Canada. Diamond brought greetings from Canada and expressed this challenge for the consideration of the assembly: "Today, efforts throughout the world are directed towards more and more industrial expansion, and higher and higher standards of living. These trends, together with the population trends, will call for still greater quantities of metal in the future. Already our usage of metals is on such an immense scale that we view with concern many of our national and world mineral resources. Even an optimistic estimate of these resources carries with it a grave warning. We must face the question of where our metals are to come from a few generations hence. Certainly we must look to utilization of our low grade deposits; to improve exploration methods in the search for new mines and to improve technology. We must, also, look to better uses of our metals and to expand the uses of our more abundant metals; but even that may not be enough. There will be need for ever increasing order in mining affairs, consistent with national and world interest. To some people this situation might imply increased governmental participation in mining affairs. It is my view, however, that this is not necessarily so, and I am sure that we in the metal mining industry will all agree that the answer

Gov. Arthur B. Langlie

to this problem should come from the industry itself; we know better than anyone else the nature of the problem and how to solve it. We must find the method and conduct and coordinate our affairs in such a way as to insure continued health of the industry and continued independence of action. Thus we can insure public confidence and satisfaction of the market demands made upon us. Some additional controls may be necessary; if so, by all means let them be self-imposed."

After Diamond's forceful statement, Chairman Easton introduced Howard I. Young who responded with hearty approval to the welcome and to the warning words of Governor Langlie and Mr. Diamond. Those who had contributed time and energy to building the program and to handling the arrangements for the 1949 Metal Mining Convention were introduced and guest speaker, Herman W. Steinkraus, president, Bridgeport Brass Co., and president, U. S. Chamber of Commerce, delivered the fine address which appears on page 18 of this issue.

Group Conferences Attract Interest

Following the regular sessions, as reported elsewhere, special industry problems were discussed by experts in their respective fields on Wednesday afternoon. At the Tax Conference, Henry B. Fernald, chairman of the AMC Tax Committee, presided. The importance of removing tax deterrents to investment, exploration and development was stressed as rectal to the perpetuation of the mining industry. The inadequacy of certain present provisions of the tax laws and regulations was given attention.

Keen interest was shown in the Gold Producers Conference led by Donald H. McLaughlin, chairman of the Gold Producers Committee of the Mining Congress. Joseph Stagg Lawrence, consultant to that committee, gave a clear exposition of the results of currency devaluation in various countries since the devaluation of the pound on September 18, 1949. The probable effect of a free market for newly-mined gold was discussed and the present free market for gold in its natural state was described. The opinion was expressed that there would come a time when certain economic factors, including, perhaps, a decline in our exports and a business recession, would bring about an advance in the price of gold by the U. S. Government. In the meantime, it was the consensus of opinion that there should be established a free market for gold in the U. S., with the privilege of selling newly-mined gold in any domestic or foreign market so as to ascertain the realistic worth of gold in paper dollars.

Two other important conferences were held at which interested mining men discussed the problems of the strategic metals industry and public lands policies of the Federal Government. S. H. Williston, vice-president, Cordero Mining Co., presided at the Strategic Metals Conference while Donald A. Callahan, Vice-President of the Mining Congress; C. Girard Davidson, assistant secretary, Department of the Interior, and Marion Clawson, director, Bureau of Land Management, led the discussions on proposed changes in the mining laws and their administration at the Conference on Public Lands.

State Mining Secretaries Confer

Representatives of the various state mining associations met to discuss mutual problems and to plan cooperative effort on questions affecting the mining industry. Carl J. Trauerman, secretary of the Montana Mining As-

The Annual Banquet in the lobby of the Davenport Hotel featured Rudy Vallee as star entertainer

4000 words ±

sociation, presided over the all-day meeting. Among topics considered were pending State and Federal legislation, public land policies, incentives for the mining industry, tax matters, and public relations questions.

Not "All Work and No Play"

On the Sunday evening preceding the formal opening of the convention, a cocktail party was held for the active group responsible for planning the outstanding convention. Program speakers, committee chairmen and members of the various committees were honored in the attractive surroundings of the Early Birds Club which had kindly made its facilities available. A well-deserved opportunity to relax and to meet their co-workers from all over the United States was afforded.

After the close of business sessions on Monday, buses were available at the Davenport Hotel to take convention-goers to Spokane's famed Natatorium Park. There a Mining Jamboree that will be long remembered was enjoyed until the wee hours of Tuesday morning. Liquid refreshments and an appetizing, ample box lunch supplemented by hot foods were served on rustic tables among the pine trees. Fortified with good food, groups wandered down to have fun on the various attractions of the park. Thrill trips were taken on swinging airplanes, the roller coaster, and other mechanical monsters. Some hearty souls spent the full evening indulging in these rugged activities, while a larger group danced to the music of a fine orchestra in the spacious Natatorium ballroom.

No regular entertainment was scheduled for Tuesday night. Thus old friends had an opportunity to get together and make up for lost time. The night spots of Spokane were besieged by throngs of miners out for an evening's fun.

High point of the week's activities was the annual banquet held on Wednesday evening in the gaily decorated lobby of the Davenport Hotel. Fine food was set before the hungry miners and soon vanished. Toastmaster Donald A. Callahan presented honored guests seated at the head table, but the complete absence of any speeches was a noteworthy feature of the banquet. A full evening of relaxation remained to be enjoyed when the program was turned over to special entertainment and dancing. Lively professional talent held the attention of the banqueteers. Acrobatics, characterizations and other skills were displayed before Rudy Vallee, featured entertainer, put on a sparkling performance. Old tunes and new, of a style especially dear to miners' hearts and memories, were sung. An evening of both modern dancing and old fashioned square dancing put the finishing touches on this top-notch function of the mining year.

Mining Jamboree at Natatorium Park was complete success

Post-Convention travelers cruised picturesque Lake Chelan

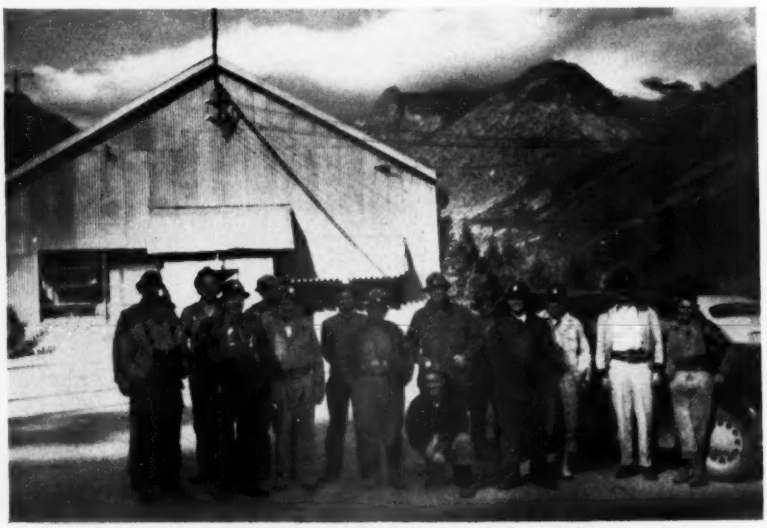
Ladies Enjoy Special Features

Actively participating in all of the week's events, the ladies had, in addition, some special entertainment arranged to amuse them while the business sessions were being conducted.

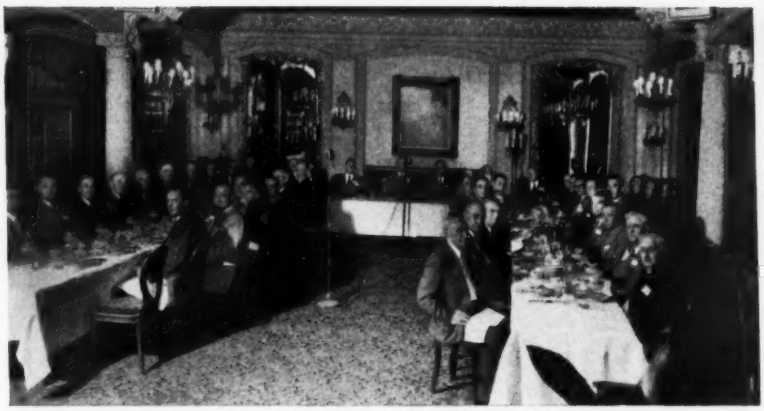
Mr. and Mrs. Robert P. Porter held a reception and cocktail party for the ladies at their lovely Spokane home on Monday afternoon. On Tuesday, a luncheon and fashion show was held at the Early Birds Club, where the ladies took an advance look at the fall and winter costumes they would soon be wearing.

Field Trips Cover Wide Area

Following the close of the formal convention activities the remaining days of the week were devoted to field trips to some of the Northwest's major mining and metallurgical operations. On Wednesday afternoon, September



Visitors to Holden inspected underground operations



Board of Governors, Western Division, American Mining Congress, holds luncheon meeting

28, buses carried an inspection party of 53 to the Trentwood rolling mill of the Permanente Metals Corp. and on to Permanente's aluminum reduction plant at Mead. On Thursday, September 29, a party of 36 took off by bus to visit Trail, B. C., and the reduction works of the Consolidated Mining & Smelting Co. R. W. Diamond, vice-president and general manager of the company, was host to the group at his home after a thorough inspection of the plant. Also on Thursday, a group of 30 went by bus to see Grand Coulee Dam, the Grand Coulee and to view the ancient waterfalls of the old Columbia River. The party returned to Spokane through the Big Bend wheat area.

Buses took 41 trippers on Friday, September 30, to the Reeves MacDonald mill in British Columbia, where they had an opportunity to inspect the "newest and most modern mill in North America." Returning to the United States in the afternoon, the party visited the surface plant of the Pend Oreille Mines & Metals Co. before returning to Spokane.

For those with their own transportation to Chelan, a trip was arranged to visit the Holden mine of the Howe Sound Co. The group left Spokane on Thursday to meet on the 8:30 a. m. boat leaving on Friday morning, September 30. After a four-hour ride on beautiful Lake Chelan, the party went on up to Holden by bus. The afternoon was spent in an inspection of the mill and surface facilities of the mine. That evening a get-together was held at the home of Mr. and Mrs. John J. Curzon for the visitors and the Chelan Division staff. There, the usual kitchen crowd gathered to break a lot of rock over long drinks. On Saturday morning a number of the group went underground where they saw at first hand some of the details of the long hole blasting methods used in producing the complex copper-gold-zinc ore. Following lunch, the party of 20 left Holden by bus to Lucerne and the return trip via boat to Chelan.

Reports from various persons who participated in these splendid trips agree that a thoroughly interesting and informative time was had by everyone who took advantage of these opportunities to visit plants in the Northwest. Cordial thanks are due to those who worked out the arrangements and who extended their hospitality in entertaining the visitors.

New Governors Elected

At the meeting of the Board of Governors D. D. Moffatt, one of mining's most outstanding leaders, was elected Chairman of the Western Division. He will take an active role in developing plans for the 1950 meeting in Salt Lake City. Newly-elected members of the 42-man Board of Governors are as follows: Blair Burwell, consulting mining and metallurgical engineer and president, Mineral Engineering Co.; John D. Hamm, manager, John D. Hamm Mining & Milling Co., Ltd.; Harold D. Bailey, manager, Bradley Mining Co.; Joseph H. Taylor, vice-president, Peru Mining Co.; F. W. Libbey, director, Oregon State Dept. of Geology and Mineral Industries; Otto Herres, vice-president, Combined Metals Reduction Co.; James Ivers, vice-president and general manager, Silver King Coalition Mines Co.; Milnor Roberts, president, West Coast Mineral Association; W. L. Ziegler, general manager, Pend Oreille Mines & Metals Co.; and Roger O. Oscarson, secretary, Northwest Mining Association.

1950 Plans

Next year's convention will be coupled with an exposition of the latest developments in mining machinery and equipment and will be held at Salt Lake City, Utah, August 28-31 inclusive.

Plans are well under way for the 1950 meeting which will be held at the extensive Utah State Fair grounds, a mile from the center of the city. The exhibits and meetings will take place in a number of conveniently located buildings. Leading manufacturers plan to exhibit a broad variety of mining equipment and supplies and everything points to another record-breaking Convention and Exposition.

D. D. Moffatt

All hotel reservations will be handled through a central housing bureau, and application forms will be distributed throughout the industry soon after the first of the year. In the meanwhile, requests for reservations may be sent to the Convention and Visitors Bureau of Salt Lake City.

Mill foundation and ore bins, Pend Oreille Mines & Metal Co.

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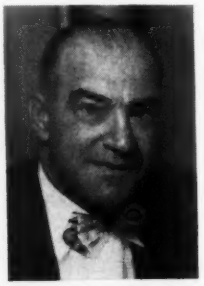

WILLIAM J. COULTER
National Chairman, Program Committee

Digests of Convention Papers

Abstracts of papers delivered at convention sessions are published here in their order of presentation. A number of these will appear in full in future issues of Mining Congress Journal.

THE STATE OF THE INDUSTRY

Session Chairman
HOWARD I. YOUNG
President
American Zinc, Lead & Smelting Co.

Prospects for the Nonferrous Metals

By DR. JOSEPH ZIMMERMAN
Editor-in-Chief
Daily Metal Reporter

ABOUT a year ago, Dr. Zimmerman said, the metal mining industry was obtaining prices that made the industry seem to be sitting on top of the world. In reality, it was sitting on a keg of dynamite. Official metal prices were high and unofficial prices exceeded them. When prices began to decline, the restraining influence of the large producers accounted in large measure for an orderly price recession.

At the same time, when copper, lead and zinc were extremely scarce, the Munitions Board was needled for lagging in securing stockpiling supplies. Another twist was given to the inflationary spiral when the Government entered the market and competed with civilian industry for the limited supply of metal.

Little attention was paid in 1948 to the fact that high prices might discourage consumption. The change came suddenly. Consumers woke up to the realization that they could get all the metal they needed without paying fancy premiums. Buying activities ceased as users of metals became eager to reduce high inventories. This action coincided with the general down trend in business.

What no one is able to understand, Dr. Zimmerman said, is why the Government also withdrew as a buyer of metals especially since stockpile goals were far from completed. Common sense would seem to dictate that the Government should so time its purchases for metal stockpiling to avoid conflict with the economy of the civilian consumer.

Stockpile purchases were resumed in July and the Government has contracted to buy a certain tonnage of copper and lead for the balance of this year. Commenting upon the Government's stockpiling program, Dr. Zimmerman urged that less politics confuse the issue.

In summing up his remarks, he stated that the total of items that may be evaluated does not presage a return to the metal boom of 1948 nor does it equal a business depression. Industrial peace was cited as a key factor needed to establish an encouraging future for the nonferrous metals.

Status of the Strategic Metals

By JAMES P. BRADLEY
Vice-President
Bradley Mining Co.

CONFINING his remarks to antimony, mercury, and tungsten, Mr. Bradley pointed out that postwar consumption of these three metals is considerably higher than prewar, but that domestic production is now at a low ebb. The Bradley Mining Co. is operating its newly-installed smelter at Stibnite, Idaho, on accumulated inventories of antimony concentrates.

During the first half of 1949, mercury production was at the lowest annual rate since 1850 when the keeping of records was started. The present price of about $73 per flask does not encourage development or new exploration. Some of the operators still in production will mine out their best ores before shutting down. There seems to be nothing to justify maintaining mines on a stand-by basis after closure.

Domestic tungsten is being produced at a large loss. Producers must decide whether to stay in business and gamble on the market going considerably higher or to give it up as a bad job and abandon operations.

Mr. Bradley stressed the point that although the strategic value of these metals is high, the dollar volume is low; the total value of 1949 domestic production of antimony, mercury, and tungsten will probably be under $5,000,000. The cutting of tariffs, he asserted, and other actions favorable to foreign producers discourage domestic strategic metal miners, who feel that Government is counting too heavily on the availability of foreign sources and that too little thought is being given to the importance of a healthy domestic mining industry capable of expansion in times of emergency.

Devaluation and the American Gold Producer

By JOSEPH STAGG LAWRENCE
Vice-President
Empire Trust Co.

TWO recent events of importance to gold producers are devaluation of the British pound and the statement by Nicholas Havenga, Finance Minister for the Union of South Africa, charging that delegates to the Bretton Woods Conference in 1944 had not fulfilled their virtual commitment to revalue gold if and when the value of paper money should reach a point of depreciation at which high costs would become intolerable to gold producers.

Devaluation of the pound was a confession of the competitive impotence of English industry and the financial insolvency of the English government. This situation developed over a long period of time in which English politicians dissipated the nation's wealth; in recent years by offering greater and greater benefits to the voters.

England's public debt has grown as the government has issued floods of paper currency, a method employed by the greater part of the civilized world with a resulting depreciation of currency. The American public through substantial grants to other nations delayed arrival of the day when the false scale of currency values had to be admitted.

Devaluation, Mr. Lawrence claimed, offers some possibility of lowering the cost of gold production. Revaluation abroad has redressed the previous injustice to foreign gold producers committed in the Bretton Woods pact. The American producer remains in the same price vise which has been tight for the last 15 years.

Mr. Lawrence asserted that the primary purpose of a so-called currency stabilization scheme is to persuade the public that a depreciation in the American dollar, which has in fact already occurred, has not occurred. It deprives the gold miner of a fair price for his product. Only political action can redress this injustice.

The Future of Silver

By ROSS D. LEISK
General Manager
Sunshine Mining Co.

COINCIDENT with a greatly expanded industrial consumption of silver, Mr. Leisk said, world production has declined drastically from an all-time high of 274,000,000 oz in 1937 to the present annual rate of 160,000,000 oz. Floating stocks of the metal have been depleted and current demand is strong for both industrial and monetary purposes. Silver requirements for the U. S. Treasury for monetary purposes are enormous. This has eaten away the Treasury's supply of unpledged silver and the former huge inventory has dwindled to about 160,000,000 oz. It is reported that the Treasury has reentered the market in order to maintain its silver reserve at about this figure.

It is pretty well conceded, Mr. Leisk claimed, that lend-lease silver to foreign governments is gone for good and does not constitute a threat hanging over the market. While the Nationalist Chinese government is striving desperately to establish a currency system with a metallic base, the Chinese Communists are similarly trying to place Communist China on a silver standard. The ultimate fate of China may depend on who gets there first with the most silver.

The future of the domestic silver producers depends on lifting of the price ceiling under which they operate. This can come about by reduction of the 30 percent seigniorage through Congressional action, or a substantial increase in the price of silver in the open market. This may come to pass, he postulated, because we are standing on the threshold of a vast industrial expansion throughout the world which will carry with it substantially increased industrial requirements for silver.

LABOR RELATIONS—MINING LEGISLATION

Session Chairman
LOUIS BUCHMAN
General Manager, Utah Copper Div.
Kennecott Copper Corp.

Work of the Conference of Western Senators

By HON. PAT McCARRAN
U. S. Senator from Nevada
Chairman, Western Conference of Senators

THE Conference of Western Senators was organized in January 1947 to find solutions to the common problems confronting the Western States. The Conference, throughout its existence, has given careful consideration to problems of nonferrous metals, gold, silver, and strategic minerals. It has also thoroughly discussed questions of reciprocal trade, taxes, money and banking, agriculture, appropriations, forestry, public land laws, irrigation and reclamation.

Senator McCarran, who called the meeting which resulted in the formation of the Conference and who has been its Chairman ever since, said it had led a successful fight for appropriations for the Interior Department, has approved a measure to reimburse gold mine owners and operators for losses sustained as a result of WPB Order L-208, and had been responsible for efforts to save from complete abandonment the nation's manganese, tungsten, mercury and antimony mines.

He pointed out that while the Conference had not sponsored the O'Mahoney bill, S. 2105, to stimulate exploration for and conservation of strategic and critical minerals and metals, this bill has the approval of the Chairman of the Conference and probably all of its members.

McCarran said he is confident the Conference of Western Senators will continue to grow in accomplishment and influence.

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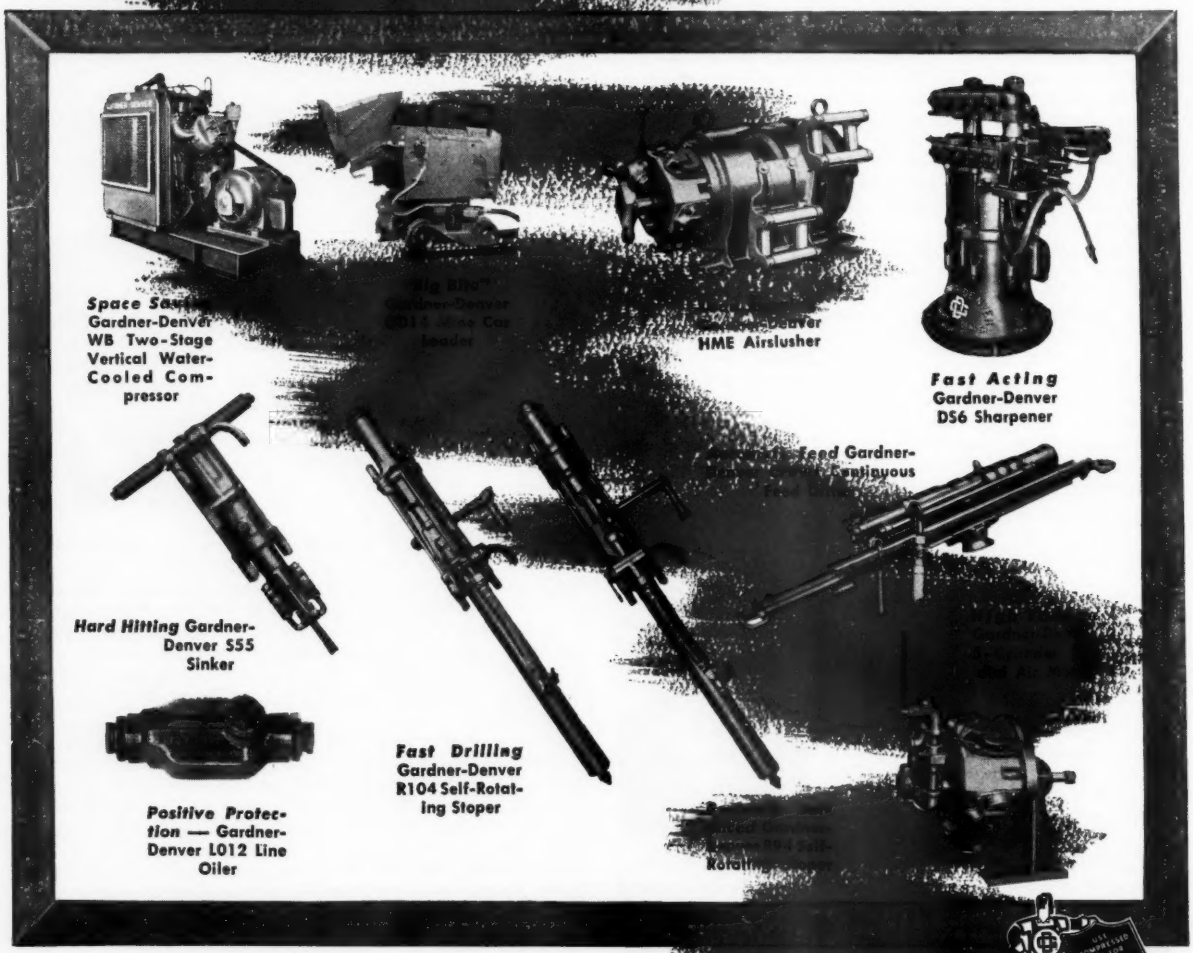
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Significant Developments in Mining's 1949 Wage Negotiations

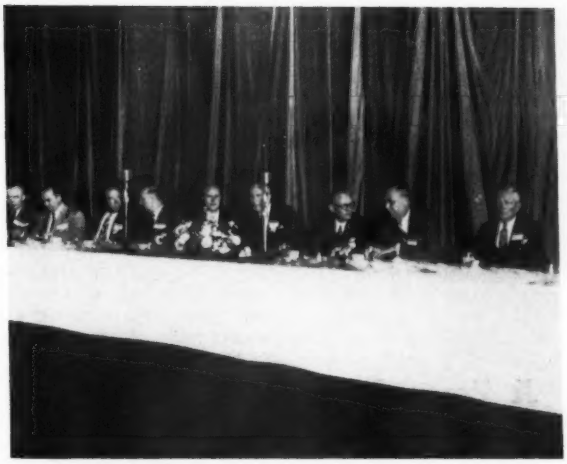
By JAMES K. RICHARDSON
Manager
Utah Mining Association

WAGE negotiations that have been consummated in the nonferrous mining and smelting industry have been characterized, in the main, by renewal of 1948-49 contracts with, in some cases, reduced workweeks, James K. Richardson told assembled mining men. He said, "There have been instances of reduced wage scales where economic conditions have precluded a continuation of mining operations without this vital cost concession. They have also appeared, in the zinc smelting industry, fourth round wage increases which have only added to the chaotic confusion which seems to have characterized the general scene. * * * A look at the picture from the sidelines which can, and probably will, be called impractical and idealistic is most disheartening. It discloses, upon conscientious analysis, many tactical weaknesses; inexplicable positions; short range strategy; and evidence of little realistic, planned, thinking through of the labor problem. There are some bright spots in the picture and those individual operations stand out like knights in white armor. Their labor relations are monuments to the integrity of purpose behind their policies and principles.

"I would, indeed, be remiss in my responsibilities to this gathering if I should leave you with the impression that the confusion is limited only to the managerial field. While labor's strength lies, largely, in its unity of purpose plus public recognition, in many cases, of wrongs unrighted; their weakness lies in their failure to develop honest, sincere and able leadership with an ability to correctly evaluate, for their membership, the hazards of the path they follow. Perhaps, here too, management has been remiss in its duties and responsibilities through its failure to assist in the development of this leadership."

He decried the action of either industry or labor in bypassing certain legal restrictions in the Taft-Hartley Act, and the inclination of both to place themselves in the position of delivering ultimatums during labor negotiations.

He called for a realistic view of the legislative picture urging the industry to guard against the threat of "harassing legislation"; and declared what we need today are many, many "freedom to's"—"freedom to create; freedom to grow; freedom to work; freedom to provide jobs; freedom to seek independence; freedom to be individuals."



A portion of the speakers' table at the Welcoming Luncheon

The Communist Menace in Labor Unions

By ROBERT E. VIVIAN
American Metal Market

COMMUNIST infiltration into labor unions in such strategic fields as metal mining, transportation, electrical and shipbuilding industries, declared Mr. Vivian, constitutes a threat to our national security and to the free enterprise system.

He emphasized that stable industrial relations can never be achieved "while those whose aim it is to promote unrest occupy positions of power in important unions." He praised metal mine operators when he said: "Many of you, at great cost have fought such techniques as those of the smelter union in an effort to free your employes of the snares with which Communists had entrapped them. It is my hope that you will maintain your vigilance and increase your determination to expose Communist use of your workers as small pawns in a worldwide political struggle. The Communist never tires of lies and he never gives up. Belief in the free enterprise system and eternal watchfulness are the only things that can defeat him."

The International Union of Mine, Mill and Smelter Workers, he asserted, provides an ideal example of Communist infiltration into labor unions operating in basic industries and the CIO has officially found it to be Communist-dominated.

Outlining the control of the mine-mill union by John Clark, Reid Robinson and Maurice Travis, who bowed to Communist dictatorship, Vivian explained their maneuverings to retain control of the top positions in the union while telling rank and file members that charges that the union's executive officers were linked to the Communist party were without foundation.

When Maurice Travis, secretary-treasurer of the union, signed the non-Communist affidavits required under the Taft-Hartley Act he "mocked that law because his statement made it very clear he is still just as much a Communist as he ever was."

Robert E. Vivian

Travis was quoted as saying that he wanted to "make it crystal clear that my belief in Communism is consistent with what I believe to be the best interests of the members of this union."

That statement, Vivian said, poses the question of whether the mere tearing up of a membership card in the Communist party fulfills the requirements of the law.

"The issue, as I see it, is this," he said. "The smelter union has been dominated by Communists and from the union's own statement that situation is to continue. The Taft-Hartley law says specifically that those who use facilities of the National Labor Relations Board shall not be Communists."

He suggested that the metal mining industry urge the Department of Justice to investigate fully the IUMMSW non-Communist affidavits and determine whether the union, representatives of which still deal with the Communists, has not violated the Taft-Hartley law.

MILLING PROGRESS

Session Chairman

ROY A. HARDY
Consulting Engineer in Charge
Getchell Mine, Inc.

A Perspective of Milling Operations

By NATHANIEL HERZ
Chief Metallurgist
Homestake Mining Co.

UNIT processes of milling may be divided into two groups, comminution and separation. Comminution processes comprise crushing and grinding. Gyratory and jaw-type crushers minimize impact with a lever mechanism that applies pressure. Harder abrasion-resistant wearing parts may expand the usefulness of impact-type crushers.

Reduction crushers of the cone or gyratory type are coming into more general use, but in larger plants rod mills are crowding into the same field, and are coming into greater use as fine crushing mills. Ball mills are migrating downward in the particle size of feed and product.

Rods are usually high-carbon steel but balls may be chill-cast iron, ni-hard, forged carbon steel, or alloy steel. Specially treated alloy rod may be worth investigating. A comparative study of liner service as well as ball and rod wear on a basis of steel wear per kilowatt hour would be valuable to the industry.

In separatory processes rapid elimination of free mineral and gangue with retention of middling in the grinding circuit is the ideal condition. Gravity concentration has progressed from simple sluices and riffles to automatic strakes and Humphrey spirals; from pans or vanning shovels to modern tables, and from wicker baskets through hand jigs to modern jigs. The Heavy-Media process is rapidly gaining in importance. Magnetic separation and electrostatic separators are finding wider use, as is the Dutch States cone.

Flotation has been subjected to extensive research with the result that efficient separations may be readily made. The trend is towards simpler flowsheets and larger units; partly caused by higher labor and supply costs, by depletion of rich ore bodies, and by higher taxes. More automatic controls are being used.

In the future, lower grades ores must be worked. New materials are coming into use, but the demand for metals will continue. Progress may be made by applying milling processes to other materials than natural ores. In our perspective, the future appears small, but as it comes closer it will expand until it exceeds the present, just as the present always exceeds the past. Technical improvements will increase in the future, but legislative bodies and those who elect them must be properly educated so as not to nullify technical progress.

Improved Flotation from Crushing Plant Change

By JAY J. BURNS
Mill Superintendent, Edwards Division
St. Joseph Lead Co.

FOLLOWING a description of the original crushing plant used at Balmat and the flowsheet then used, Mr. Burns analyzed the factors that were considered in the construction of the new crushing plant. Objectives to be obtained were lower cost per ton of crushed ore; finer feed to rod mills; higher crushing rate; elimination of rolls; greater storage capacity; concentration and simplification of operation; and improved safety.

The new crushers installed are gearless and driven by direct connected synchronous motors. They are used in a simple flowsheet of one primary crusher and four secondary crushers in closed circuit with vibrating screens.

The 22-in. primary crusher is driven by a 100-hp motor. It is fed by two apron-type feeders reducing the ore from 10 in. to 2⅞ in. This product goes via belt conveyor and elevator to ¼-in. screens. Undersize is conveyed to two storage bins. Oversize goes to secondary crushers and then joins the discharge from the primary crusher and thence back over screens.

Dust is eliminated at the crushing plant and collected in bags by a fan which exhausts 25,000 cfm.

All objectives have been reached with the new crushing plant. The crushing rate has been increased from 125 tons to 170 tons per hour. The crushers operate well on wet and sticky ores. Delays in the mine hoisting schedule have been eliminated.

—*Discussion*—

E. B. Jennings *(General Superintendent, Universal Exploration Co.)*: At Jefferson City a similar arrangement was employed in a zinc mill that has been running for about 19 years without any improvements. On investigation, it was found that most of the zinc loss was in the coarse particles and in the —200 mesh. The idea was conceived to take some of this higher grade product out of the circuit before it was reground in the rod mill. A fine mesh screen was installed and flotation feeds resulted that had no 35 mesh in it. Tailings were reduced to about five percent in zinc assay. Adequate figures are not yet available to be certain as to just what is happening, but some saving is being established.

New Sink-Float Plant at Sullivan Concentrator

By H. R. BANKS
Mill Superintendent
Consolidated Mining & Smelting Co. of Canada, Ltd.

TO meet changing conditions at the Sullivan mine and enlarge the mill to handle additional tonnage, sink-float was decided upon after thorough investigation. The medium in use at the Sullivan plant is drawn from the lead concentrate and checked on the basis of density, viscosity and stability. The coarse fraction comes from the flotation of primary classifier overflow and the fine frac-

tion from regular lead concentrates. Mixed in proper portions and diluted give a density of 2.97, the medium has proven most satisfactory.

Float is returned to the mine for use as backfill. An accumulated stockpile of more than 200,000 tons of float containing 0.2 percent lead and 0.3 percent zinc is ready to be used as mine backfill. Elimination of this extremely hard fraction of the ore has enabled improvement of the grind of the remainder with consequent improved metallurgy. A small amount of medium, 0.07 lb of concentrate per ton of float is being lost now. Screening costs are high now, but as time goes on, they will be reduced.

—*Discussion*—

C. Y. Garber *(Mill Superintendent, Bunker Hill & Sullivan Mining & Concentrating Co.)*: The choice of media in sink-float operations depends upon the individual case, the cost of material and the requirements of the separation. Most work on equipment is being done on the separator itself, but there is room for research into the quality of the medium used. In separators, the opportunity to use subsurface feedings offers a chance to reduce the size of equipment.

At Bunker Hill the same kind of screens are used for washing the product that are used for screening feed. This field requires further investigation to reduce operating costs.

There is a possibility of splitting a particular ore into two fractions, each fraction of which would require different treatment. At Bunker Hill successful separation of the igneous portion from the clay portion of one ore has been accomplished. Neither was a finished product but the subsequent treatment required for each was vastly different on account of grinding characteristics.

TAXATION—INCENTIVES—STOCKPILING

Session Chairmen

HENRY B. FERNALD
Loomis, Suffern & Fernald

E. H. SNYDER
President
Combined Metals Reduction Co.

Trends in Canadian Mine Taxation

By V. C. WANSBROUGH
Executive Director
Canadian Metal Mining Assn.

(Presented by Ernest N. Patty, President & General Manager, Yukon Gold Placers, Ltd., and Alluvial Golds, Inc.)

DEAN Patty set forth the principal trends in taxation policy of the Canadian federal government and emphasized that the direction in which all thoughts turn is to the development of the natural resources in the Provinces. He declared it inconceivable that any feasible form of encouragement and stimulus will be withheld from those who develop mines and produce new wealth.

Taxable corporate income is henceforth to be taxed at the rate of 10 percent on the first $10,000 and 33 percent on the excess. It is proposed that Canadian income tax law allow a credit against personal income tax equal to 10 percent of the dividends received from common shares, as an express encouragement to investment capital. The carrying forward of losses has been increased from three to five years.

The depletion rate for base-metal mines is 33⅓ percent of taxable income; for gold mines 40 percent. New metalliferous mines are exempt from taxation for the first three years of operation, with an additional six months allowed as a tune-up. This provision has been granted several times on a three-year basis and it was extended this year to cover mines coming into production up to the end of 1952. During this tax-exempt period gold mines, but not base-metal mines, are allowed to defer write-offs for preproduction and development expenses, including depreciation. These expenses are thereafter written off at the rate of 25 percent per annum. This year permission to defer write-offs during the tax-exempt period is being extended to base-metal mines.

Another encouraging provision in Canadian tax practice is to allow all prospecting expenses incurred by a mining company as a deductible item from earnings in computing taxable income.

There is no tax on capital gains in Canada and "a bona fide prospector who sells, transfers or signs his rights to a mining prospect is not liable to income tax . . . on the consideration received, as such consideration constitutes capital." A shareholder of mining stock is permitted to take a 20 percent depletion allowance from his dividends for the purpose of computing income tax.

Tax Treatment of New Mining Ventures and Producing Mines

By S. H. WILLISTON
Vice-President
Cordero Mining Co.

NOTING that more and more American mining companies are becoming active in Canada and South Africa, Mr. Williston emphasized that with our current Federal tax practices, held over from wartime, there is a widespread decline in exploration and development of new mines and new mineral reserves here at home. He stressed the fact that Federal tax policy penalizes severely any individual or small corporation which attempts to discover and develop new mineral resources within the United States.

Mr. Williston reasoned that only the large corporation, which is assured of sufficient income so that it may absorb a wide diversity of exploration charge-offs, is in any position where it can explore for new deposits and develop them when found. He explained that such exploration expenditures, if unsuccessful, can be charged off against income before taxes, and if sufficient projects are carried on to cover the law of averages the corporation is investing untaxed income in future ore reserves.

As an encouragement to all mining, improvements were recommended in our revenue laws to: (1) make percentage depletion tax-free to the mining stockholder; (2) eliminate double taxation of mining corporation dividends; and

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(3) permit expensing against current income, whether of the corporation or the individual, of all exploration and development expenditures.

—*Discussion*—

Paul B. Jessup *(Vice-President, Day Mines, Inc.):* This discussion urged amendment of the income tax law to permit expensing exploration and development costs, either in the year in which incurred or as a deferred charge at the option of the mine operator. The question was raised of increasing the current metal mine percentage depletion rate of 15 percent. Accelerated depreciation rates were advocated as an incentive to much needed exploration and development. As a further encouragement, Mr. Jessup called for a two-year carryback and an eight-year carryforward of net operating losses. To make natural resources investments more attractive to corporate shareholders he recommended that the tax laws (1) provide for the recoupment of the shareholder's investment where the enterprise is profitable; and (2) facilitate the charge-off of stock losses where it proves unprofitable.

Mord Lewis *(Anaconda Copper Mining Co.):* The point was made that it was virtually impossible for successful individual investors or small investing groups in new mining ventures to retain sufficient money rewards, after taxes, to warrant the taking of even a moderate risk. Frequently, said Mr. Lewis, the best possible hope for moderate return by such groups is an outright sale of their property interest, and enjoyment of a capital gains treatment of the transaction arising from such a sale. He called for inclusion in the revenue law of the amendment drafted by the American Mining Congress Tax Committee to provide substantial relief in the tax treatment of exploration and development expenditures, both for account of new properties and producing mines. He emphasized that tax reform along this line is vitally needed and will undoubtedly stimulate the discovery and utilization of new deposits and provide increased employment throughout the industry.

Donald H. McLaughlin *(President, Homestake Mining Co.):* Stating that past dissipations of Government revenues and the losses of the war are "water over the dam," Dr. McLaughlin recognized that heavy taxes are an unavoidable necessity. He insisted, however, that extravagances of the present must be corrected if we are to check the depreciation of the dollar and the confiscation of savings. He called upon Congress and the Government to recognize the peculiar character of the mining industry in the application of the general income tax laws, stating that mining consumes the property on which the enterprise is based and that depletion is a right under laws that tax income—not a special privilege granted to the miner.

Dr. McLaughlin emphasized that the American Mining Congress Tax Committee must be constantly vigilant to detect and oppose technical provisions and procedures that by obscurely hidden ways add new burdens or deny rights that should be recognized. He declared that in connection with depletion, it should be recognized that costs are costs—all the way from exploration to refining and marketing; that in the end there is no distinction between capital expenditures and daily operating costs. He called for lessening the present tax burdens through more equitable administration of the present income tax laws and regulations, with more adequate recognition of depletion for metal mining, and with full allowance of recovery of all costs of initial exploration—including earlier unproductive efforts on other deposits—before imposing taxes on the returns from the metals that are won from a new property.

Exploration and Production Incentives

By A. E. PETERMANN
Vice-President & General Counsel
Calumet & Hecla Consolidated Copper Co.

BELIEVING that current thinking on the subject of incentive payments for nonferrous metal mining is somewhat cloudy, Mr. Petermann declared that traditional economic thinking starts with the relationship of price, supply, and demand in a free market. He said, however, that when metal prices drop they drop too far and stay down too long. Then when they rise, they rise too high, and the nonferrous metal business continues to be "a feast or a famine." In the long run, production of nonferrous metals is decreasing much faster than it would with a stable price structure.

Stating that if we again become involved in international strife, we must have an adequate supply of nonferrous metals within our own borders, Mr. Petermann emphasized that stockpiling is only a partial answer. He declared that unless we can produce during an emergency, no stockpile will take care of us for long and that time will not permit us to discover and develop new mines, and unwater, recondition, and redevelop abandoned mines. Our only safety, he said, lies in maintaining adequate, current, production—presently operating mines must be kept operating, and new mines must be found and developed to replace them when they are worked out.

Warning that with present taxes and costs, private enterprise can no longer provide enough capital to do all the exploring that is necessary, Mr. Petermann inquired "who then should finance the job?" He continued, "The cost of keeping marginal operations and explorations going must be paid by those who will benefit. The people of the United States will reap the benefits. The people of the United States should pay the cost. This principle is not a new one. It justifies maritime subsidies and air mail contracts. It is the principle which lies behind the European Recovery Program. If it applies to expenditures abroad, it should at least be equally valid at home."

Incentives Proposed for the Mining Industry

By W. C. PAGE
Assistant General Manager of Western Operations
U. S. Smelting Refining & Mining Co.

MAJOR benefits to the nation and to the mining industry, as represented by the prospector, leaser, and small, medium and large operators can best be obtained by a revision of the existing tax laws. Such legislation, Mr. Page said, would attain these objectives and would operate within the framework of our free enterprise system on a completely nondiscriminatory basis, which would benefit and further promote efficient mining on a small or large

scale as well as provide for increased incentive in the search for and development of new ore deposits. He advocated the AMC Tax Committee program, with the addition of a tax-free period for new mining ventures—as in Canada.

As is the case in every type of business, there will always be mines that cannot operate profitably at any price level, high or low, and there have always been mines that have and will operate intermittently or steadily. The market price, he declared, as eventually established by the consumer, decides who operates and who does not, depending upon the cost and efficiency of the operation. He cautioned that it is virtually impossible to determine, when a mine closes down, whether such reserves as it may have left will be lost. The history of mining is full of examples of mines profitably reopened after being down 25 to 50 years or more, and constantly changing economic and technologic conditions make it impossible to forecast today whether a mine can or cannot be reopened a few years hence.

Mr. Page stated, however, that should Congress decide that some sort of incentive is desirable for exploration, such incentive should be on the same basis for both large and small producers, should require matching dollar for dollar by the producer, and should be confined strictly to what generally is considered exploration in the mining industry; viz., development for unknown or undeveloped sources of essential or strategic or critical metals or minerals, including extensions of known deposits.

Page suggested that if all the effort expended on tax provision and subsidy legislation could be combined toward obtaining tax revision, real progress could be made. He called attention to the report of the Senate Committee on Interior and Insular Affairs on the O'Mahoney bill, S. 2105, that "cogent evidence has been presented to the Committee, that tax allowances for exploration and development costs are an effective means of attracting much needed venture capital into mining."

Exploration and Production Incentives

By DR. JAMES BOYD
Director
U. S. Bureau of Mines

COMMENTING on the O'Mahoney bill, S. 2105, Dr. Boyd gave assurance that the Administration is not interested in entering the mining industry, and has no desire to control mineral production. He declared it is the resolute view of the Administration that stockpiling for national security purposes must remain distinct and entirely disassociated from any industry-aid programs. Government believes with industry, he said, that changing trends in the national economy have created an unfavorable climate for venture capital in respect to small enterprises. It was explained that this is particularly true as regards new exploration activities and that the President announced in his budget message of 1949 that he would support a program of Government aid for minerals exploration.

Dr. Boyd said it has generally been conceded that the smaller units of the metal mining industry have in the past been the more successful and enterprising in finding new ore deposits. The thought behind the Administration's position, in respect to Government assistance for exploration, was that an attempt should be made to equalize the opportunities for the smaller units or individual entrepreneurs so as to permit broader participation in discovery and development of mineral resources. He concluded by stating that the Administration is making every attempt to cooperate in the formulation of legislation that will have the reasoned support of the mining industry; that much thought has been devoted to this problem and every effort will continue to be made toward a practical solution.

Stockpiling

By MAJ. GEN. A. B. QUINTON
Acting Director for Industrial Programs
Munitions Board

SPEAKING for the Munitions Board, which administers the Stockpiling Act, General Quinton stated that materials for the stockpile are being purchased as fast as Congress appropriates money for the program. He remarked that the Board has been urged to buy more than its plans call for of copper, lead, zinc, mercury, tungsten, and other minerals produced in the United States to absorb temporary surpluses and keep the mines fully operating. The Board has also been urged to make heavy purchases from Britain in order that the British may in turn buy more from us. However, it is the Board's firm policy to conduct the stockpile for its primary purpose and not to deviate to accomplish side objectives.

General Quinton said that the Board considers that its duty under the Act is to stockpile principally those materials produced abroad. He explained that eight of the materials being stockpiled are produced in the United States to the extent of one-half of our peacetime industrial requirements; only 27 materials of the total of 69 on the list are purchased in the United States at all. Stating that the stockpile when completed will cost somewhat more than $3,000,000,000, he commented that the stockpile inventory at the end of June 1949 contained materials worth a little under a billion dollars, with deliveries scheduled through June 1950 which will bring the inventory up to about a billion and a half, or about halfway. Another half-billion dollars worth of materials are on order for delivery after the end of June 1950, which will bring us two-thirds of the total, and another billion dollars of appropriations will be needed to complete the present stockpile objectives.

He stated that although the Board had tried to keep the stockpile in good balance, some materials had proved a lot easier to buy than others. As a result, he said the Board had completed its objectives for a number of the 69 materials, and certain others are ahead of schedule.

Quinton declared this to be a serious matter because of the inherent interdependence among many of the materials. As an example, he said, our steel industry depends absolutely on manganese, but if it had all the manganese it needed, we would still need other materials to form the alloys of steel.

General Quinton concluded by saying that the stockpile rounds out our whole national security program, to make this nation as strong as possible in all of the elements needed in war; to serve warning to any would-be aggressor that the United States is prepared to defend itself and to back up with force its international responsibilities.

OPEN PIT AND CONVEYOR MINING

Session Chairman

PERRY G. HARRISON
Vice-President
Hanna Iron Ore Co.

Diesel Electric Locomotives at Ajo

By ALFRED T. BARR
Mine Superintendent, New Cornelia Branch
Phelps Dodge Corp.

(Presented by Warren E. Fenzi, General Superintendent, Morenci Branch, Phelps Dodge Corp.)

FROM nine active levels of the open-pit at Ajo, Ariz., the New Cornelia Branch is producing 28,000 tons of ore and 19,000 tons of waste daily. A new main line was recently constructed from the lowest operating level to the crushing plant by the electrification of the tracks on this line and on an existing approach to waste dump, and by the replacement of steam locomotives with trolley-electric locomotives. These are equipped with two 325-hp Diesel engines which furnish power over bench track and other non-electrified track in the system. The installation of Diesel engines has eliminated need for electrifying some 23 miles of track.

Haulage equipment consists of seven 125-ton trolley-electric locomotives equipped with Diesel auxiliary power, and three 125-ton, 1000-hp Diesel-electric locomotives.

The electric locomotives haul ore from the lower level of the pit and the Diesel-electrics haul waste from the upper levels and do switching service.

The electrified main line was built on a ruling grade of three percent, adverse to the loads. The maximum speed attained by the electric locomotives hauling a train of five loaded cars is 17 mph compared with the 10 mph for steam locomotives on the old two percent grade. In comparison, steam locomotives required 24 minutes for a trip now being taken in 9 minutes by the electric locomotives.

Power is supplied to the motors from either overhead trolley or from one or both of the two Diesel engine driven d-c generators. Trolley and Diesel power cannot be applied simultaneously, but changeover from one source of power to the other is a simple and quick operation. Diesel fuel oil consumption was 30.9 gal per locomotive shift in hauling 18,253,000 tons of material at an average rate of 1783 tons per locomotive shift. Average distance hauled was 2.46 miles and average lift was 264 ft. Electric power consumption was 1152 kw-hr per locomotive shift.

Discussion

L. F. Pett *(Mine Supt., Utah Mines Division, Kennecott Copper Corp.):* From the standpoint of flexibility of operation, a combination of Diesel electric and Diesel power is ideal. At Bingham Canyon the straight electric type of haulage is in use. Approximately 1200 ft of bench track is moved daily for the 30-shovel operation. Track shifters, angle dozers and road graders prepare grades and shift track, getting approximately 50 ft of track line per day, per track man shift.

Through a series of 5-ft drop cuts, a new bottom level is established once every two years, using regular crane and shovel crews, standard electrification and track shifting methods. Excessive drilling and blasting and excessive track maintenance have characterized this secondary work of the drop-cut operation. A 45-ft boom new revolving type shovel is being installed to reduce the cuts from ten to three to overcome part of these difficulties.

During the war 64 locomotives were in use, with 61 of these on daytime assignment. One locomotive out of 21 was out of service each day. On the basis of comparison with Diesel locomotive service requirements, this figure would change from three locomotives out of service per shift to seven.

Maintenance is conducted on the night shift and about three or four locomotives are worked on each shift. They are ready to run the next morning. There are two Diesel locomotives at the mill which require two hours maintenance per day following an eight hour shift. Monthly maintenance requires two shifts. At the end of each year it takes a complete overhaul of 25 or 30 shifts to put the motor back in operation. Diesel locomotives have availability of approximately 95 percent when figured against a straight electric locomotive.

Underground Belt Conveyors at Potash Company of America

By RUSSELL G. HAWORTH, R. R. KNILL, and JAMES EDMUNDS
Respectively Assistant General Manager, Mine Superintendent, and Mine Development Engineer
Potash Company of America

This article was published in full in the October issue of MINING CONGRESS JOURNAL. Résumé of discussion follows:

C. A. R. Lambly, *(General Supenintendent, Pend Oreille Mines & Metals Co.):* Every conveyor installation must be designed to meet specific problems. The conveyor now being installed at Metaline Falls, Wash., will operate on an incline to bring ore to the surface. This incline was sunk 1450 ft at 17 deg and continues for another 1350 ft at 10 deg. The installation will be equipped with a 30-in. belt traveling 350 fpm to move 350 tons per hour from the underground crusher pockets to the surface crusher bin. To service the conveyor system the incline will be equipped with rubber-tread, electric-tractor locomotives which will pull rubber-tired carry-all carts.

Drilling and Blasting 12-Inch Holes

By G. J. BALLMER
Superintendent of Mines, Chino Mines Division
Kennecott Copper Corp.

(Presented by F. C. Green, Assistant General Manager, Chino Mines Division.)

FOLLOWING years of blasting with 6-in. holes and then 9-in. holes it was decided to experiment with 12-in. diam holes. Preliminary work resulted in required information on hole spacing. No saving of powder was postulated as estimates planned for making savings on footage of holes drilled.

An experimental shot resulted in good fragmentation

and several drills were then equipped with 12-in. tools. Use of the 12-in. blast holes has permitted wider spacing of the holes and increased toe load.

Statistics on two shots were presented to show the comparison between 9-in. and 12-in. holes. Forty-four 9-in. holes with a total footage of 2249 ft were blasted with 19,500 lb of powder with the result that 4.80 tons were broken per pound of powder. Twenty-nine 12-in. holes were drilled with a total footage of 1508 ft, loaded with 22,250 lb of powder with the result that 4.60 tons of rock were broken per pound of powder. Use of 12-in. holes, with their greater toe load and back-break, has made it possible to drill and blast a greater depth of bench with seven rows of holes than is ordinarily possible with eight rows of 9-in. holes.

—*Discussion*—

Warren E. Fenzi *(General Superintendent, Morenci Branch, Phelps Dodge Corp.):* From 1940 to 1947 the amount of material broken by 9-in. churn-drill holes has progressively increased from 33 tons per foot of hole drilled to 58 tons per foot of hole drilled. A better fracture is obtained on holes which have a heavy burden. Experiments in blasting 9-in. sprung holes gave reasonably good results. Using 12-in. holes, it was found that the larger machines drilled 30 percent faster, or approximately the difference in the weight of tools. In 1949, additional machines were purchased capable of drilling 12-in. holes.

At the present time powder is allowed to rise within 25 ft of the surface in 9-in. holes; this problem of powder rise is eliminated with the use of 12-in. holes.

Bit cost per foot drilled by 12-in. bits is twice the cost of that drilled by 9-in. bits, however bit cost per foot drilled still only totals six percent of the total cost per foot drilled.

The use of 12-in. tools eliminates failures as the heavier string of tools will drill fractured ground more successfully. The blast can always be scheduled properly when using the larger machines.

PROBLEMS OF THE SMALL MINE OPERATORS

Session Chairman

KUNO DOERR, JR.

Manager, East Helena Plant
American Smelting and Refining Co.

Mechanization

By ROGER V. PIERCE

Consulting Mining Engineer

Salt Lake City

MECHANIZATION in both small and large mines is similar except that the size of equipment varies directly with the size of the job to be done. With wages not less than $10 per day the cost is at least $1 for every half hour of effective working time. Thus, it is imperative that any job that can be done by machine should not be done by hand. Not only should slushers and loaders, drills, haulage motors, etc., be employed, but machinery should be used to service these pieces of equipment.

Small mine operations should take the utmost advantage of modern mechanized drifting equipment including jumbos, mucking machines, and motor haulage. Detachable, single-pass, or hard face insert bits should be employed to cut down steel service and handling. Quick-coupling air and water lines save large amounts of labor as do rail installations made up in complete sections with metal ties. Lighting equipment should be of the best to enable the miner to make each move count.

Every underground operation should employ the mechanical equipment best suited to perform a given task. Slusher hoists, skid-mounted drill rigs, and conveyor belts should be utilized in stoping operations if at all feasible. The ultimate objective is the moving of a complete set of working tools in a single package into a given location to do a specified job.

Diesel locomotives have been adopted for haulage and as the motor power source in one underground shaft hoist. Another mine has packaged timber to reduce the amount of manual labor in handling. Progressive management will adopt existing equipment and work out mechanical methods to improve unit operation.

Labor Relations of Small Mines in the Coeur d'Alene Mining District

By J. D. KIEFFER

Manager

Spokane-Idaho Mining Co.

ADVISING small mine operators to work constantly for good labor relations, Mr. Kieffer pointed out that since the cost of labor for a small mine is normally about 60 percent of the operating expense, the most important immediate objective to insure the economic success of the venture is to build up a crew composed of efficient workers and capable foremen. This can be accomplished, he asserted by choosing qualified foremen and by hiring workers carefully.

In the Coeur d'Alene mining district, Kieffer stated, both the large and small companies pay the same wage scale but since the small mines are located farther from towns they must offer some inducements in addition to wages in order to get good men. These, he said, may include free transportation to and from the mine in company-owned buses, and a general use of incentive pay plans. He also emphasized that the less favorable working conditions and lower degree of job security that might exist at some properties does not constitute any problem in hiring good men at the small mines.

Accounting for Small Mines

By JAMES E. HOGLE

Assistant General Manager

Rico Argentine Mining Co.

EMPHASIZING their importance to small mine operators, Mr. Hogle urged the setting up at the outset of such accounting procedures as will enable management to make decisions concerning development work and mining.

Essential factors to be considered in establishing cost accounting, he said, are labor, materials, and supplies. He

pointed out that labor laws require adequate records concerning employes, and that these records can be further expanded to make proper cost distribution of the payroll to determine labor costs on development work and on the mining operations. Cost data on materials and supplies likewise prove invaluable to management.

Also pointed up was the importance of maintaining accounting records in such detail that taxes may be properly computed. He emphasized that "all of our operations are conducted with a view to an ultimate profit and without proper records we have no way of segregating our profitable operations from the unprofitable ones until the sad day arrives when we realize that the total operation constitutes a loss."

Qualifications of the Superintendent of a Small Mine

By FRANCIS A. THOMSON
President
Montana School of Mines

DR. THOMSON told the Convention that reasonable qualifications for the superintendent of a small mine include the understanding that "mining is the art of making money out of ore"; a knowledge of what constitutes a mine; the ability to get along with both men and women; having a good, sound sensible wife; a good understanding of mining, mechanics and electricity; and ability to command the confidence of his directors and stockholders.

He emphasized the importance of the superintendent knowing his miners personally, treating them fairly but firmly, and having no "pets."

Dr. Thomson declared that the most satisfactory superintendent of a small mine is likely to be a technical graduate with sufficiently varied experience as shift boss or foreman to give him sound judgment and sufficient maturity.

He advised the operators against appointing the man who raises the money as the mine's superintendent, since the qualities of the promoter differ widely from those needed in the operating man.

Mine Financing

A Panel Discussion participated in by Carl J. Trauerman, Secretary-Treasurer, Mining Association of Montana; James E. Newton, Regional Administrator, and Ellsworth Y. Dougherty, Mining Engineer, Securities and Exchange Commission

CLASSIFYING small mines as "the seed corn of the mining industry," Mr. Trauerman said they cannot be financed in the main by large companies but can be by speculative capital. He suggested that small mine operators incorporate and issue assessable stock to finance primary mining ventures.

Small mine operators should not incorporate with too small a capital structure, Mr. Newton asserted, and added that the capital structure should be designed to allow for expansion and new developments. He favored sale of common stock saying that preferred issues are out of character for small mine financing. SEC experience has been that the use of security firms, brokers, dealers and underwriters has been the most successful avenue of securities sales.

Mr. Newton revealed that some $600,000,000 has been raised for mine financing since the SEC came into existence, the vast majority of this amount having been raised for mining properties in development or exploratory stages and for small companies. He also disclosed that the SEC is considering amendments to the regulations which would make mandatory the use of a prospectus "except in the case of a relatively small offering."

Mr. Dougherty stressed the importance of carefully preparing sales literature to avoid irrelevant and immaterial matter and unsubstantiated claims. He also suggested that more stress be placed upon effective presentation of sound engineering and geological data.

MECHANIZATION—IMPROVEMENTS IN MINING PRACTICE

Session Chairman
H. F. MILLS
Manager, Iron King Branch
Shattuck-Denn Mining Corp.

Diesel Power Underground

By S. S. CLARKE
General Superintendent, Tri-State Mines Division
Eagle-Picher Mining and Smelting Co.

THIS article appears in full on pages 22 to 28 of this issue, together with a discussion by J. H. East., Jr., Regional Director, Region IV, U. S. Bureau of Mines.

Sinking Bunker Hill's Auxiliary Inclined Shaft

By STANLEY W. McDOUGALL
Mine Superintendent
and
JOSEPH E. GORDON
Assistant Mine Foreman
Bunker Hill & Sullivan Mining & Concentrating Co.

THIS article was published in full in the October issue of MINING CONGRESS JOURNAL.

Rock Drilling Progress at the Holden Mine

By J. J. CURZON
Manager, Chelan Division
Howe Sound Co.

THIS article appears in full beginning on page 35 of this issue.

Insert Bits at Climax

By C. J. ABRAMS
General Superintendent
Climax Molybdenum Co.

EARLY in 1948 experiments were started with tungsten carbide bits. Prior to that time the standard Timken bit was used in all operations. In the fall of 1948 a labor contract was let on a tunnel with the company furnishing all material and supplies.

As test work had indicated some savings, the Ingersoll-Rand Carset bit was used with alloy rod and stud. Bit results were satisfactory but the stud gave trouble. Using the Park A alloy rod, 68 percent of all steel trouble was from the stud. It was decided to go back to the straight carbon rod and thread them, with Ingersoll-Rand furnish-the 115 thread. Then, 64 percent of the breakage was in the shank and only about 20 percent on the threads. Average life of the alloy rod was 161 ft and, with the straight carbon rod, about 170 ft before breakage.

By heat treating and annealing the Park A alloy, they were threaded, resulting in a life of more than 400 ft per breakage.

Drilling in gneiss and granite with 3½-in. machines and 1½-in. steel, using aluminum shells with a 4-ft change, it is not uncommon to drill out a 10 by 14-ft heading in 45 minutes.

Driving a single heading 3400 ft long the average was 38.2 ft advance per day. Beyond the 3400-ft point the tunnel branched and from two to three headings were available for drifting. Advance averaged approximately 48 ft per day. Bits have averaged 485 ft with an over-all cost per foot of hole drilled of 6.4¢.

Some Insert Bit Experience in the Coeur d'Alene District

By R. R. WEIDEMAN
Assistant General Manager
Silver Dollar Mining Co.

DRILLING an extremely hard dioritic rock, using detachable drill bits, we were obtaining approximately six to eight inches per bit with excessive steel breakage and rock drill maintenance. Timken tungsten carbide bits were tried as these bits are interchangeable with the steel used for the regular detachable bit. Then it was found that miners spent 50 percent less time in actual drilling. After a month's trial in 1948, the Timken tungsten carbide bits have been used exclusively. Bit cost has been cut by 75 percent, steel cost by 50 percent, and rock drill maintenance cost by 35 percent. In a recent trial we started with 17 1⅝-in. Timken bits, drifting in quartzite and diabase of medium hardness. A 3½-in. automatic feed drifter with 1⅛-in. round lug shank steel, and an average air pressure of 80 psi were standard. A total footage of 19,744 ft was drilled with 129 resharpenings; footage drilled per bit averaged 1232 ft before discard. None of the bits were completely worn out.

As the tests were satisfactory, tungsten carbide insert bits will continue to be used until something better is introduced. The development of the insert bit is a forward step but is not the final answer to the rock drilling problem.

Bunker Hill's Experience with "Throwaway" Bits

By R. S. HOOPER
Assistant Mine Superintendent
Bunker Hill & Sullivan Mining & Concentrating Co.

IN 1938 Bunker Hill began to change from conventional steel to detachable bits and in 1941 Ingersoll-Rand "jack bits" were standard. About 18 months ago tests were begun on the Throwaway bit in an attempt to reduce costs. Results obtained were encouraging and the Throwaway bits are now going into service in stoping operations. Within the near future the major part of all drilling in the Bunker Hill mine will be done with these bits.

The Throwaway bit is of a four-wing design with a socket having no taper or eccentric. Rod ends are ground or machined to one inch diameter, plus or minus .001 in. with parallel sides and only a slight bevel on the end to facilitate starting the bit on the rod. Cutting edges of the bit average 64 Rockwell "C" and skirts 25 Rockwell "C." No difficulty is experienced in losing bits even in gravelly ground where rods are pulled with automatic feed machines. With the smaller bit diameters now in use the steel has been changed to 1⅛-in. Park alloy.

Although shank ends are heat-treated, no treatment of any kind is used on the bit end. Not one bit end of a rod had been broken off in service. Reports indicate that rod life has been at least doubled.

In sinking 1100 ft of shaft, tungsten carbide bits were used throughout. Although the cost per foot of hole drilled was high in comparison to other mine drilling costs, advantages were gained in speed and freedom from trouble. In sinking, the rock drilled was harder and more abrasive than the average of the mine and gauge loss was so great that bits averaged only 115 ft plus 34½ ft after grinding.

The Throwaway bits have materially increased drilling speed and explosives have been saved. Bits are easily removed by machining two flats on the rod diametrically opposed. When the bit is struck directly over the flat, the skirt springs and the bit is easily removed by a bit knocker. In the Bunker Hill mine the Throwaway bit is especially suited to the medium hard, abrasive quartzite that predominates in development work.

Craig Bit Performance

By J. S. McINTOSH
Mine Manager, Zincton Unit
Sheep Creek Gold Mines, Ltd.

THE Craig bit is a four-winged bit with a method of spiral attachment of bit to rod. It offers a simple, foolproof lock, while retaining the advantage of quick, easy removal with a knock-off block. The locking action of the Archimedes spiral is forged on the inside of the bit skirt and on the rod end; it is automatic and effective for the most of the 360 deg of the bit skirt.

Performance depends on the type of rock being drilled and the drilling method adopted. In hard, white quartzite or glassy quartz, at a speed of 6.7 in. per minute, bit life will average 1.2 ft and rod life 16.2 ft. In limestone, with a drilling speed of 18 in. per minute, bit life is 7 ft and rod life is 155 ft.

At Sheep Creek Gold Mines average rock penetration is 6.7 in. per minute. Bit practice is to use 1⅞-in. starters followed by five changes down to 1⅜ in. The first three changes are ⅛ in. and the last two 1/16 in.; bit life in this ground is 1.17 ft and rod life 16.2 ft.

At the Zincton property bit practice is 1¾-in. starters followed by four changes down to 1⅞6 in. The bit life is 7.32 ft per bit and rod life is 155 ft. The Craig bit was selected for the following features: ease of attachment and removal; less breakage due to type and length of socket; and its positive lock against turning on rod.

The Liddicoat Detachable One-Use Bit

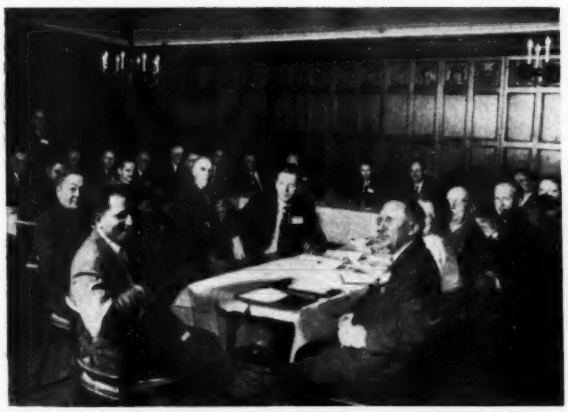
By G. L. CRAIG
Director of Sales and Research
Calumet & Hecla Consolidated Copper Co.

(Presented by Buck O'Donnell, Mine Superintendent, Idaho Maryland Mines Corp.)

UNDER normal conditions, drilling at Calumet & Hecla properties is of the order of 300,000 to 350,000 ft per month. Prior to the adoption of the Liddicoat bit, the cost per bit use for all mines was just over 9¢, or about 2½¢ per foot of hole drilled. With standard resharpenable detachable bits, an average of 80 ft of holes was drilled per shift. Since the adoption of the Liddicoat bit, footage per miner per shift has increased from 80 to 90 ft—approximately 12½ percent. Footage drilled per bit has increased from 4½ to 13 ft—an increase of about 300 percent. Bit cost per foot of hole was reduced to 1¢.

Liddicoat bits are produced by forge-extrusion in a four-winged design with a pilot construction that provides two-stage cutting action. A slip-on attachment gives a positive lock by means of four flats on the rod end. The rod ends may be ground or machined.

The Liddicoat bit is attached to the drill rod end by lining up the flats pushing the bit on by hand pressure. Bits are removed most conveniently with a knock-off block cored to fit over and slide on the drill rod.



Public lands group discusses current problems

PUBLIC LANDS—MINES OF THE FUTURE

Session Chairman
EVAN JUST
Director, Strategic Materials Division
Economic Cooperation Administration

Why Revise the Mining Laws?

By MARION CLAWSON
Director
Bureau of Land Management

EMPHASIZING the obligation of the Bureau of Land Management to promote all public land uses, Mr. Clawson spoke of the conflicts which occur between the various users including mining men. He set forth the position of the Department of the Interior and his Bureau and made reference to the draft of a proposed bill which has had wide circulation for purposes of discussion.

Mr. Clawson contended for revision of the mining laws, charging that the present laws hold back development on the public domain, interfere with other desirable uses and result in the acquisition of mining claims for purposes other than bona fide mining. He stated that less than one-fourth of the patented mining claims in California have been used for mining, although the locations may have been valid insofar as the showing of mineral is concerned. Admitting that there are serious delays in the patenting of mining claims and that the procedure is costly and unnecessarily troublesome, he said he did not believe the blame lay wholly within his Bureau.

In further discussing changes in the mining laws Mr. Clawson advocated provision for geological and geophysical mining claims; increased assessment work requirements; loss of title if claims are not developed; registration of claims with District Land Offices; abolition of extra-lateral rights; and reservation by the Government of surface rights on mining claims.

—*Discussion*—

Charles F. Willis *(State Secretary, Arizona Small Mine Operators Assn.):* Many of the suggested changes in the mining laws, as proposed by the Bureau of Land Management and in part by the Hoover Task Force were castigated by Mr. Willis as quite radical and he charged that they would completely nullify the philosophy of the basic mining law of the country. A few of the proposals, he said, have merit and probably will receive wholehearted support from the industry, but some opposition can be expected because of the widespread belief that once the Congress starts amending, no one can tell to what extent that amending will go. He declared there is definite fear as to what an orgy of changing will ultimately bring forth, and that it may lead to a system under which acquisition of mineral rights will be possible only through leases.

Mr. Willis agreed, in principle, to the proposal to provide for geological or geophysical mining claims but sharply criticized the other proposals. He deprecated the moratoria on assessment work granted by Congress in 15 of the last 17 years, charging that this practice is responsible for much of the present confusion concerning legality and ownership of many unpatented mining claims. Speaking of the fraudulent claims issue, Mr. Willis emphasized that mining law violations should be tried in the courts—not in the Bureau of Land Management.

Horace M. Albright *(President, United States Potash Co.):* The basic objection to the mineral leasing laws, heretofore enacted, is that they leave so much to administrative regulation that an explorer for or a discoverer of minerals may find the rules changed on him before he can get a lease. Under the present system, Mr. Albright said, there are opportunities for revision of leases at the end of a term—or at the end of a stipulated period of time even when there is no termination date—so as to impose obligations and responsibilities on a lessee which might put him at a great disadvantage as against a competitor in future operations.

Mr. Albright cited as one advantage of leasing that States cannot tax mineral deposits on the public domain. He advocated retention of the present mining law which, he declared, is so firmly grounded on the principle of free private enterprise that it should not be supplanted by new mining statutes unless they are just as securely built on the same sturdy, durable foundation.

Tomorrow's Ore

By E. H. WISSER
Consulting Mining Geologist

SMOOTHING out the jagged ups and downs, the production and consumption curves for copper, lead, and zinc continue to rise over the years. The great bulk of production has come from mining districts first exploited a generation or more ago. We are not finding the mining districts that should replace, tomorrow, the districts that we are fast exhausting today.

Do mining districts, as yet unknown, queried Mr. Wisser, exist in the accessible parts of the globe, and within the present vertical limits of mining, say the outermost two miles of the crust? This question may be answered with an unqualified Yes.

Individual ore bodies may lie concealed close to extensive mine workings, because of faulting or the unpredictable vagaries of mineral deposition. Great groups of ore bodies, mining districts, must, however, hide from us under more extensive cover. By "cover" is meant a more extensive concealment than that conveyed by the term postmineral capping. There are many examples where, if erosion had cut down a few score feet less than it did, ore bodies would be lying concealed still. There are hundreds of square miles of material that without a doubt cover concealed mining districts. In a systematic scheme of exploration for covered districts, attention would first be focused on areas where the capping is thin and where some mineralization sticks up through it in one or two places.

The peripheries of capped areas merit thorough investigation. This type of exploration requires intelligent study of the environment of ore bodies of mining districts, to enable geologists to differentiate between a weak showing, complete in itself, and a weak showing that points toward a great mining district, below it or to one side of it.

By focusing attention on the problem as a whole, an intelligent beginning can be made on the systematic search for deposits concealed by cover. To enable us to continue as a producer of metals vital to our industrial machine, such a systematic search must be started, and without delay.

—*Discussion*—

Samuel I. Bowditch *(Geologist, American Smelting & Refining Co.):* All of us engaged directly or indirectly in the business of ore finding in this area have been forced to the conclusion that the bulk of ore deposits even remotely associated with outcrops have been discovered, developed and largely extracted. While the cleanup of known districts may keep us going for perhaps a generation, or even two in the case of some metals, new districts must be found if we are to continue to produce our own metals.

Unquestionably it will take years before we have the necessary information to find deposits concealed by postmineral cover; we will need to develop new techniques and sharpen and refine our present ones. In the meantime, we must continue to look in areas where there is little or no postmineral cover but where erosion has not yet reached the main ore bearing horizon. To accomplish both tasks the combined efforts of State and Federal agencies, the laboratories and faculties of our colleges, as well as the laboratories and the physical drive and venture capital of our mining companies is essential.

The day is fast going when a few tens of thousands of dollars are sufficient to prove or disprove the existence of an ore body. Now, several hundred thousand dollars may well be spent before we can tell if ore exists in a given area; even after such expenditure we may find that there is not enough ore to justify an operation or that the grade is too low to be economic.

George M. Fowler *(Consulting Geologist, Joplin, Mo.):* More than 80 percent of the copper, lead, and zinc mined in the United States has come, for many years, from 36 to 40 districts, all discovered by prospectors. These districts range in size from considerably less than a cubic mile, to those several miles in lateral extent and several hundred feet to several thousand feet in depth. Ore bodies are found in almost every kind of rock.

Many square miles throughout this country remain to be prospected. There are many parts of the United States where there is not a drill hole or anything to determine what is there. The clues will have to be found by combining facilities of geology, geophysics and geochemistry. To help in this work, adequate maps, photographs and available data of all kinds will be required. The ore seekers of the future are going to be better trained and better equipped, and further important ore deposits will be found by them.

M. H. Gidel *(Chief Geologist, North American Properties, Anaconda Copper Mining Co.):* New mines are scarce. In the United States it has been 42 years or more since a new mining district was discovered, although there have been a few individual mines located. This lack of new mines cannot be said to be due to any falling off in exploration; but that there are mines yet to be discovered is assumed to be true.

Our future desires and hopes for new discoveries of

mineral deposits must rest upon the intelligent application of the detailed data and principles that have been developed in the science of ore deposits.

In the search for ore, probably the most important study is that of structural conditions, and next, the genesis and zonal arrangements, if any, of minerals in the deposit. Increasing emphasis in study should be devoted to the geochemical and the geophysical reasons for ore deposition. Correct correlation, interpretation and appraisal of recorded facts on the geology of a mineral deposit should determine whether or not the discovery merits development.

Present economic conditions and tax structures require correction so that the venturesome in private enterprise will not be driven out of the mining business.

William E. Wrather *(Director, U. S. Geological Survey):* Geologists as a class are convinced that there are hidden deposits to be found, but are acutely aware that present exploration techniques are not turning up new sources of mineral supplies anywhere near commensurate with foreseeable needs.

The importance of developing entirely new techniques is frequently stressed; however, existing geological methods must be utilized as imaginatively and effectively as is possible. No feasible method should be left untried. The fields of geophysics and geochemistry are particularly promising prospects for new developments, but no one should expect a revolutionary method to materialize over night that will dispense with the accumulated geologic wisdom of past generations.

The combined geological talents of this country will find difficulty in appraising the mineral potential of the huge expanses of the United States and its possessions at a rate sufficient to keep pace with growing national needs.

SAFETY AND HEALTH—NON-METALLIC MINING

Session Chairman

GEORGE H. RUPP
Manager, Mining Dept.
Colorado Fuel & Iron Corp.

Underground Dust Control

By JOHN W. WARREN
Assistant Ventilation Engineer
Anaconda Copper Mining Co.

THRESHOLDS, or maximum allowable concentrations of dust, are guides in the determination of atmospheric environment in a worker's breathing zone. South African medical research has established a standard of concentration of 1 mg per cubic meter. No new Rand miner that entered the industry since August 1923 has yet contracted silicosis. Similarly, thresholds have been established in the various states.

Dust, as particulate matter that has a maximum dimension of 10 microns or less, is considered of pathological consequence in heavy concentrations. In sizes below 10 microns, dust has no appreciable weight, mass or volume but does possess area. Molecular blows of the air on this area tend to keep the particles in suspension.

At Butte, all hoisting shafts are downcast air inlets. Mine yards are paved with topping to prevent dispersion of dust. Wide angle sprays at the headframe vicinity are sometimes used to set dust. In some cases, sprays have been used at skip chute doors on main and measuring pockets to operate during skip loading. Compressed air and water blasts have successively been used in sinking operations.

Headings and muck piles and all working faces must be wet down before starting work, as well as the back and sides. A compressed air and water blast is required in all sill headings. These operate on a minimum of 2 gpm of water per minute and not less than 70 cfm of air.

Research has resulted in equipping rock drills with a larger diameter water tube. Cooperative research undertaken with the U. S. Bureau of Mines included: relation of dust dissemination to water flow through rock drills; control of dust from blasting by a spray of water mist; and effect of angle of drilling on dust dissemination.

Advances in Safety in Lake Superior District

By ROBERT F. WILSON
Supervisor of Safety
Oliver Iron Mining Co.

A thorough interchange of knowledge through the Lake Superior Mine Safety Council has contributed a great deal to improvement and safety in the Lake Superior District.

In 1948, the Oliver company adopted a mandatory rule requiring all workers to wear safety glasses on the job, in shops, on the surface and underground throughout the whole working day. Advancement in facilities and in working environment include: improved lighting; guards over exposed shafts, gears, and belting; better tools with which to work; etc.

Safety observations made by foremen help in reducing accidents. Each underground foreman is required to make two observations a week on the handling of explosives. In blasting, the rule calls for the simultaneous lighting of hot wire lighters if more than one is used.

On his first day on the job, the new employe is placed in the charge of a mine safety inspector who indoctrinates him in the many phases of mining. The second day is taken up with a thorough explanation of the safety rules and suggestions listed for the type of work he is to do.

All raises over 25 ft in height are required to have two compartments, one for service, and the other for broken material. The service compartment must be covered at all time by either 6-in. cribbing or 3-in. plank. Access to the heading is provided through the chute compartment just below the cover. Opposite this opening a safety platform must be built. A signalling device and electric blasting are mandatory when the raise reaches 50 ft or more in height.

A good safety record is the result of good management and requires constant attention to details and continued effort toward improvement. More initiative, perseverance and devotion to this worthwhile cause is essential if we are to attain the goal of elimination of accidents.

Nonmetallic Mining in the Pacific Northwest

By SHELDON L. GLOVER
Supervisor
Washington State Division of Mines and Geology

INDUSTRIAL minerals are a prominent phase of mining in the three Northwestern States. In Oregon, approximately 92 percent of the output of $10,000,000 to $12,000,000 is derived from industrial minerals. Similarly, Washington derives 80 percent of its annual mineral production of $30,000,000 to $38,000,000 from industrial minerals. Idaho's industrial minerals account for 13 percent of a total mineral production of $45,000,000 to $50,000,000 annually.

In Idaho, phosphate rock is a major resource. Idaho is also a prominent producer of garnet for abrasives. In Oregon, perlite is of marked economic importance. Oregon in 1946 was the second largest producer in the United States of diatomite. Both Oregon and Washington have deposits of bauxite not yet used commercially.

Washington has a major resource in its coal. Washington ranks first in the production of magnesite and in the production of massive silica. It ranks second in the output of olivine.

Industrial mineral producers have a problem not common to other mining operations in that, although the products are of varying qualities, specifications that are frequently very severe must be met. Markets may be limited and scattered; competition is keen.

Mr. Glover described a number of Northwest nonmetallic mineral operations engaged in the production of garnet, perlite, Portland cement, massive silica, magnesite, diatomite, coal, fertilizer, and sand and gravel.

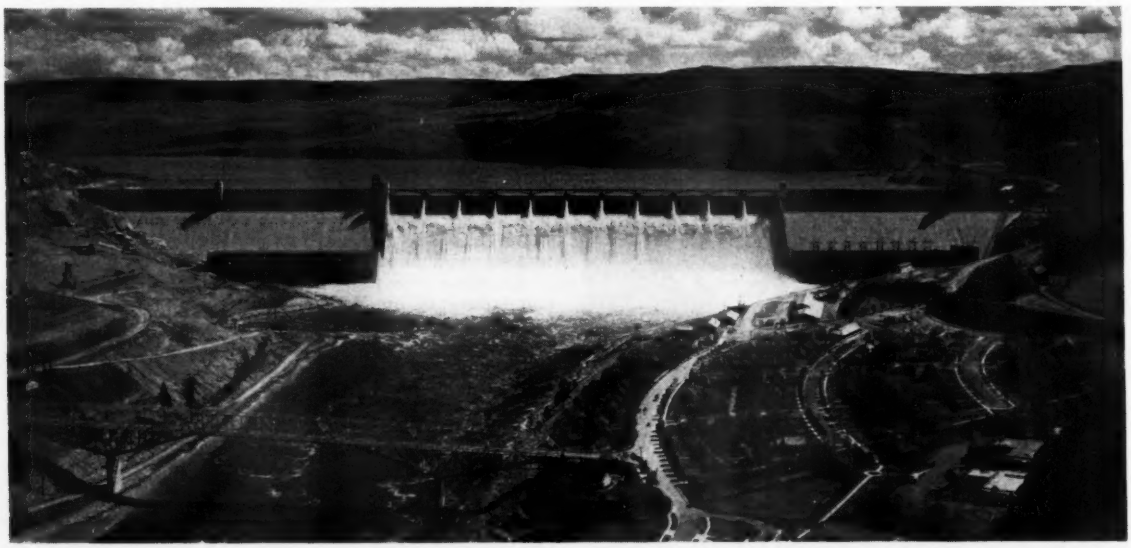
Roof Bolting

By E. A. MORGAN
Mining Engineer, Roof-Control Section
U. S. Bureau of Mines

EXPERIENCE with roof bolting indicates that this method of support will afford an effective means of reducing roof fall accidents. The basic method of roof bolting, as developed by the St. Joseph Lead Co., is to install at an angle 1-in. rods, ranging in length from 5-8 ft, on about 4-ft centers. One end of each rod is slit for about 6 in. and the other end is threaded for a standard 1-in. nut. A tapered wedge 5½ in. long is inserted in the split end of the rod and the rod and wedge are inserted in the back of a previously drilled hole. The rod is then anchored by screwing a nut on the threaded end and applying pressure thereto. The quality of anchorage will determine the success or failure of the suspension support, therefore the Bureau recommends that rods be driven with compressed-air percussion tools. Holes should be drilled accurately as to depth to obtain proper anchorage.

Experimental installations and some permanent ones have been made in coal mines, metal mines, and rock tunnels in virtually every type of roof in flat beds and one installation is in a tunnel where the beds dip up to 80 deg.

Roof bolting offers a positive, systematic method of roof support at the working face; it saves time required for setting posts or resetting timbers that have been knocked out; side clearance is improved as well as head clearance; less storage space is required for roof supporting materials; ventilation is benefited because of decreased resistance to air flow; cost of installation is usually reduced; and properly installed supports may be considered permanent.



Grand Coulee Dam, one of man's mightiest engineering works, harnesses the Columbia River for power and for land reclamation

A Declaration of Policy

WESTERN DIVISION, AMERICAN MINING CONGRESS

Adopted at Spokane, September 26-28, 1949

NEVER in the history of our nation have the American people been faced with more serious fundamental problems than those now immediately before them. Both foreign and domestic ideologies are being advanced, the adoption of which may well destroy our Government politically, socially and economically.

To meet this challenge the mining industry urges a return to the concepts which have guided our nation through its years of development to its present pre-eminent position among the nations of the world. We must:

1. End government extravagance and the growth of Federal authority over the lives and fortunes of our people. This policy is leading us, step by step, toward national insolvency and the establishment of totalitarian control.

2. Resolutely oppose the advance of Communism, in any of our social, economic and governmental affairs.

3. Re-establish the time-tested and always effective principles of self-reliance, industry, productivity and thrift, and overcome the weak-kneed reliance upon government support which is growing among our people to an alarming extent.

The mining industry has an essential role to play in the preservation of a free America. The production of minerals is pre-eminent in insuring our national safety and the well-being of our people. We urge a better understanding, on the part of those who enact and administer our laws, that the economy of our nation, the happiness and welfare of our people, and the safety of the Republic itself depend in large measure upon continued mineral discovery, development and production.

Government policies as to public lands, taxes and venture capital should be so formulated and administered as to encourage exploration and development of mineral deposits by private capital and free enterprise.

TAXATION

Our present Federal taxes remove practically all incentive for effort and investment in risk enterprises, including the discovery and development of additional mineral reserves. They should be promptly revised if our system of free enterprise is to function and to yield adequate production, employment and long-term government revenues.

Tax laws should be framed and administered to safeguard the interest of taxpayers as well as to obtain revenue for the Government. Taxes should be imposed only by clear mandate of law understandable by taxpayers, not to be distorted by hypertechnical administrative interpretations. Doubtful questions should be resolved in favor of the taxpayer.

Corporate and individual taxes, and their combined effect, should not be such as to leave inadequate incentive for incurring risk and producing income.

In taxing dividends to individuals, due allowance should be made for the corporate tax. Intercorporate dividends should not be taxed. Nothing in the nature of an undistributed profits tax should be imposed.

The maximum tax on individual income should in no event exceed 50 percent.

Taxable income for corporations or for individuals should represent only what remains after allowance for all costs, expenses and losses, and allowances adequate to yield full capital recovery. Stockholders should have the benefit of tax-free depletion allowances in determining taxable income to them from dividends. Losses of loss years should be fully deductible in determining income of years of income, with the same effect as if the income year and the loss year constituted a single taxable period. Depreciation and depletion claimed by the taxpayer should be allowed except to such extent, if any, as it is clearly established that they exceed reasonable allowances. The tax benefit principle should be applied so that amounts will be considered as allowed only to the extent they resulted in a tax benefit. Costs of development, exploration and research should be allowed as part of the operating expenses of mines. In determining taxable income, time and nature of accruals should conform as nearly as possible to good accounting practice.

The excise tax on freight, which was adopted as a war revenue measure, should be promptly repealed. It is an especially burdensome cost on the mining industry.

Taxes, whether Federal, State or local, directly affect the quantities of minerals which can be mined, processed and marketed at a profit. They can change marginal ores into waste. Existing taxes seriously diminish or destroy incentive for prospecting, exploration and development and as a consequence fewer discoveries of mineral resources are made. Severance taxes, or taxes on gross proceeds, are particularly burdensome.

SOCIAL SECURITY

We do not believe in a social welfare state. Excessive welfare activities by government inevitably compel government to undertake control of the entire national economy. Imposition of such control requires coercion by government. The creative abilities and initiative of individuals are lost. Private decision is supplanted by government dictation. This is the end of freedom.

In particular we are deeply concerned about legislative

proposals for an expanded "social security" program. The strongest emphasis should be placed on self-help and ambition to produce. Any social security program must take into consideration its effect upon our economy and the maintenance of free enterprise. A system too burdensome to industry will destroy the very source of security for the future. This is especially true of the mining industry, which is inherently dependent upon development of new mineral resources to provide employment in future years.

We strongly oppose such changes in the definition of "employee" as are contained in H. R. 6000 of the 81st Congress, or any departure from the common law criteria for determining employee-employer relationship. We adhere to the language of the Gearhart resolution, adopted in 1948, as being a fair and adequate definition of the employment relationship.

Unemployment benefit payments should not be increased to the level where employment is unattractive to the recipient.

We oppose any form of compulsory health insurance or any system of socialized medicine designed for national bureaucratic control.

GOVERNMENTAL EXPENDITURES

The American people cannot afford excessive or unnecessary expenditures, at home or abroad. All governmental expenditures, Federal, State and local, must be kept to the minumum necessary to meet essential requirements. Military expenditures and foreign aid should be most critically scrutinized and carefully administered to avoid waste. In no other way can our economy and our Government be maintained and our people be relieved from unbearable tax burdens.

GOVERNMENT REORGANIZATION

The comprehensive study of our Government and its widespread activities which has been made by the Hoover Commission is timely and far-reaching. This study points out the growth of government, the extent of its influence upon private business and individuals, and the stupendous cost of its maintenance. We urge upon the members of this industry full support of the objectives sought by the Commission. The responsibility for good government is ours. We express our approbation of the action of the Secretary of Defense in attempting to reduce civilian personnel and unnecessary expense, and commend this example to other Departments of our Federal Government.

LABOR MANAGEMENT RELATIONS ACT

The Labor Management Relations Act of 1947 was enacted by the 80th Congress for the benefit of employees, employers and the public. The 81st Congress has turned back efforts to repeal this constructive legislation and to retreat to the one-sided, inadequate Wagner Act. For these actions both Congresses are to be commended.

Although many abuses which flourished under the Wagner Act have been ended, there still remain uncurbed certain practices of some labor leaders and unions which interfere on an increasing scale with civil liberties and the free flow of commerce. Particularly objectionable are: control of whole industries by powerful labor leaders; the power of minority groups to force workers to strike unwillingly; picketing abuses against which the remedies provided by law are inadequate; and the disruptions and strife resulting from Communistic influences within unions.

Labor monopoly + industry-wide bargaining + Government seizure, as has been experienced in coal—or labor monopoly + industry-wide bargaining + recommendations from politically appointed and inspired "fact-finding" bodies, as experienced in steel—deprive individual employers and unions of their rights to bargain. Either procedure leads to the industry-wide strike which exerts pressure on a helpless public. The breaking down of industry-wide labor monopoly by again subjecting unions to the anti-trust laws would curb industry-wide bargaining and eliminate national-crisis strikes.

At some of our mines the working force is still subject to the false teachings of radical leaders who seem to have followed the Communist line in seeking to influence the policies of the International Union of Mine, Mill and Smelter Workers. Such leadership has sought to teach labor to hate and harass management, and has sought to cultivate class strife, to sabotage production, to terrorize employees and communities, and to intimidate public officials—maintaining the appearance of peaceful relationship between labor and management only when temporarily expedient. Even though a Congressional Committee and the top CIO officers have named and denounced some of such leaders, the Labor Management Relations Act lacks effective provisions to dislodge them and their continuing menace; and that Act should be appropriately corrected.

Recent administrative interpretation of the Act threatens to impose the requirement to bargain at any time—even during the existence of a signed contract—and necessitates positive correction.

In the following list of needed reforms we reiterate and augment our previously stated recommendations to the Congress of the United States for bringing to completion a fair Federal labor code:

To Eliminate Labor Monopolies

1. Require that collective bargaining be done on a plant or bargaining-unit basis, and prohibit the concerted industry-wide strike by a combination of locals or by an international union.
2. Make the prohibitions of the anti-trust laws again applicable to unions.

To Throttle Communistic Control of Unions

3. Complete the program of purging the labor-management relationship of Communistic influences by providing that the National Labor Relations Board shall immediately take away the right of representation from any local or international union, and deny protection of the law to the membership, if an officer thereof is a Communist or has been a Communist within the preceding five years; and that the Board shall not thereafter certify such union until the union can prove that it has cleared its house of such influence. Prohibit any employer from affording such union the privilege of dues check-off.
4. Forbid, and provide effective means to stop, a strike to compel an employer to recognize and bargain with a union which has not complied with Section 9 of the National Labor Relations Act and which has not used the processes of the Board, or which maintains an officer who is a Communist or has been a Communist within the preceding five years.

To Safeguard Management Rights

5. Exclude, as improper subjects of collective bargaining, union proposals encroaching on the employer's right to manage his business.

To Safeguard Workers' Rights

6. Prohibit compulsory union membership in any form as a condition of employment.
7. Illegalize a strike which is called without the prior authorization of a majority of all the employees in the affected plant, voted at an election conducted by the parties involved, by secret ballot, at the conclusion of bargaining and conciliation.

To Prevent Terrorism and Other Unfair Labor Practices

8. Provide for Federal injunctions upon application by private citizens to prohibit the restraining of the free flow of commerce by illegal strikes, mass picketing, violence and intimidation, or similar terroristic devices.
9. Declare it to be an unfair labor practice for employees of one employer to refuse to enter upon the strike-bound premises of another employer.
10. Declare it an unfair labor practice for any union or individual to interfere by force or intimidation with the right of an employee to lawfully enter or leave the premises of an employer.
11. Declare it an unfair labor practice to strike over a grievance where the existing collective bargaining agreement includes an adequate grievance procedure.
12. Provide that any employee who engages in any unfair labor practice shall lose his status as an employee.
13. Enlarge Section 8 (b) 6 of the Labor Management Relations Act to bar all types of "feather-bedding" practices in industry.

To Insure Just Decisions of the National Labor Relations Board

14. Make fully effective the principle that findings of the Board shall rest upon preponderance of evidence.

To Require the Use of Procedures Established by Law

15. Amend the National Emergency Section of the Labor Management Relations Act so as to give the President of the United States no choice but to utilize a board of inquiry as therein provided for, and the injunction provision thereof, if necessary to prevent a paralyzing work stoppage in a whole interstate industry or substantial part thereof, which if allowed to occur and continue would imperil the national health, safety, or economy.

To Restore Stability to Labor Agreements

16. Amend Section 8(d) of the Labor Management Relations Act so as to make it clear that there is no obligation to bargain collectively on any subject during the period covered by a duly executed labor agreement, whether or not the subject is covered by the agreement, except and to the extent that the agreement affirmatively provides such obligation.

OTHER LABOR LEGISLATION

We recommend that it be made a Federal criminal offense for either labor or management to engage in violence in connection with a labor dispute.

We again recommend that the Walsh-Healey Act be repealed as absolete and in conflict with the Fair Labor Standards Act. We reiterate the desirability of statutory rather than administrative definitions in the Fair Labor Standards Act.

We are opposed to further interference by Government in industry which would follow from the passage of legislation such as the "Industrial Safety Act" and the "Economic Expansion Act" as introduced in the current session of Congress.

TARIFFS

The nation must see to it that the mineral industries, as among the greatest of national assets and safeguards for the protection of its people, are maintained in sound and healthy condition. Tariff reductions that jeopardize productive ability and are detrimental to mine development weaken our economy, and are not in the best interest of the country. Recent reductions have eliminated production of at least one of our strategic metals.

We recommend that Congress exercise its constitutional authority over tariffs through the Tariff Commission, to be administered for the welfare of the American people, with suitable safeguards and strict accountability to the Congress. Proper consideration should be given to the effect of foreign wage differentials in cheap labor areas on the American worker, and also to the effect on the domestic mining industry of loans and grants for the development and expansion of foreign raw material production to be imported into this country to the detriment of American producers and workers. Ore reserves in foreign countries cannot be depended upon to meet the emergencies of an atomic age.

We oppose inter-governmental commodity agreements and cartels that call for state control over industry, or involve the regulation of production, trade and prices, in conflict with the traditional liberal, individualistic principles of Western civilization.

STOCKPILES

A large stockpile of metals and minerals is essential for preparedness against a war emergency. But national security must also be supported by producing mines, mills and smelters, with organized working forces and capacity for sustained and adequate production of materials important for military and civilian needs. This is the real and fundamental backbone of national defense.

We recommend the building up of stockpiles. The best time to build up stockpiles is when world output exceeds demand. We recommend that Congress authorize the extending of ore commitments over a long period of time in order to justify investment in mine development and equipment.

We recommend that greater consideration be given to the maintenance of sources of production of strategic and critical metals and minerals within the United States where, otherwise, these vital mineral resources may be lost or become unavailable for national security.

We favor consideration of the problems of the strategic metals separately from those of the essential and critical metals. A national policy regarding these strategic metals must be adopted promptly lest production of these metals cease within the United States.

INCENTIVES

Because of the great need for production of metal for defense, price controls, and manpower shortages during the war years, many mines had no opportunity to maintain or extend ore reserves, and some ore reserves were depleted without adequate returns. Tariff reductions, high postwar costs, heavy taxes and unstable metal prices have discouraged mine development since the end of the war. Sound national policy calls for the encouragement of research, exploration and development of our mineral resources. We recommend an incentive to encourage prospecting, exploration and the development of mines producing essential minerals.

Mineral discoveries and development of ore reserves add to our production resources and create new national wealth and taxable income. The search for new ore deposits by individuals and small corporations is being blocked by excessive taxes. The small miner needs venture capital to assist in the speculative endeavor of prospecting for and developing new mines.

A constructive tax policy is important to the further development of our mineral wealth. We urge prompt tax revision to create a favorable climate for venture capital in mining.

GOLD AND GOLD MINING

Restoration of gold to its historic function in the monetary system of our country is believed by us to be an essential move in relieving the chaotic currency conditions that seriously handicap all efforts toward economic recovery.

In order to establish the value of the present dollar in terms of gold, at which a gold standard could be restored with best hope of permanence, we advocate removal of the present restrictions that prevent our citizens from buying, holding or selling gold domestically or abroad. Pending restoration of a true gold standard, we urge that the United States Treasury continue its policy of buying all gold that is offered at $35.00 per ounce, and that the domestic producer be given the choice of accepting paper dollars for his gold at the stated rate or receiving his gold back in appropriate coins, such as pieces containing one ounce, authenticated as to gold content but without designation in dollars.

The price of such coins in the free market would afford a fair measure of the current value of the American dollar. In turn it would provide a similar measure of the value of all foreign currencies now expressed in dollars. By this empirical means, a realistic price of gold should be revealed within a reasonable time, whereupon Congress should take effective steps to restore a sound currency with unconditional convertibility of the dollar into gold at the indicated level. By such procedures, which we most earnestly recommend, the country could return to a gold base for its currency with the least disturbance and with confident expectation that it could be successfully maintained.

We again recommend the enactment of specific legislation to compensate lode and placer gold miners for the severe losses of capital caused by the arbitrary shutdown imposed during the war years. This is in no sense a request for a subsidy, but merely a just claim for restitution for the damage suffered through an act of doubtful legality and mistaken policy on the part of a government agency.

Furthermore, to the extent that the mine owners are not compensated for their losses in war years through such legislation, they should be allowed the right to carry their losses forward in computing taxable income, without the virtual denial of these just benefits through technical intricacies of the Internal Revenue Act and regulations.

MONETARY POLICY

We continue to favor a currency with the traditional base of gold and silver, with anticipation of stabilization of the prices of these metals eventually at levels that reflect their true world values.

BUREAU OF MINES—GEOLOGICAL SURVEY

The United States Geological Survey and the Bureau of Mines perform technical services of vital importance and great value to the Nation and to the mining industry. They are now headed by exceptionally able engineers of highest integrity in whom we have great confidence.

Appropriations for personnel and for the performance of the duties of these agencies as prescribed by Congress are relatively small items in the total cost of the Federal Government, and should be made available in adequate amounts to continue all their essential activities.

The energetic safety program of the Bureau of Mines in research and education is accomplishing remarkable results in accident reduction. Given adequate personnel to learn more and teach more, the Bureau will go far in inculcating a real safety-consciousness throughout the industry.

A bill now on the Senate calendar which would charge the Bureau's coal mine inspectors with police powers would inevitably cripple the present constructive safety program through diversion of the industry's safety efforts to a forced conformity with orders of Federal inspectors. We oppose enactment of this bill which would make the Bureau an instrumentality for further Federal encroachment on the rights of the States.

MINERALS ADVISORY COUNCIL

We commend the action of the Secretary of the Interior in creating the National Minerals Advisory Council, and we heartily approve the program of this Council in connection with current mining problems. The personnel is made up of outstanding mining men and we urge full consideration of the policies which it recommends.

FINANCING OF PRIMARY MINING VENTURES

To avoid the present difficulties and delays in financing primary mining ventures, we recommend that the Securities and Exchange Commission laws be amended so that only the fraud sections of the present Federal laws, rules and regulations be applicable in offering and selling primary mining securities to the public, and that the various State laws, rules and regulations go no further than that in their requirements.

The Securities and Exchange Commission laws should also be amended to provide that whenever the Government is making an investigation of possible violation under the Securities Act or Securities Exchange Act, any person subpoenaed to answer questions or to give testimony shall be

entitled to be represented by counsel, and to make or receive a copy of his testimony given in any such proceedings.

We urge further simplicity in the filing requirements of the Securities and Exchange Commission, and that district offices of the Commission be given the authority to pass on complete registrations.

We also urge that the Reconstruction Finance Corporation Act be amended to permit long term loans for the development of mining ventures, with provision for payment of principal and interest on a unit of production basis.

WATER POLLUTION

We reiterate our past position that water pollution is a local problem, the nature and extent of which varies in each locality, and we urge that Federal concern with this problem be limited to furnishing scientific aid, engineering studies and loans in aid to State or local governments. We urge that the mining industry cooperate with other industries and municipalities in effecting local solution of pollution problems. We recommend for study the statutes recently enacted by the State of California which are aimed at placing the problem in the hands of local regulatory commissions.

LAND USE

We view with disapproval any legislation to compel restoration of the surface of lands mined by stripping or dredging which would hamper orderly extraction of metals or mineral products and place unwarranted economic burdens upon the mine operator.

VALLEY AUTHORITIES

Recently there has been renewed activity looking toward the enactment by Congress of legislation providing for valley authorities and clothing their administration with arbitrary powers over natural resources.

We believe the basic principles of such authorities are destructive of our American theory of constitutional government. We approve the recommendations of the Hoover Commission and its Natural Resources and Public Works Task Forces that there should be no extension of the valley authority type of organization.

We seriously object to the activities of Federal employees and administrators in promoting the enactment of valley authority legislation and advocating theories so at variance with our American form of government.

FREE ENTERPRISE

The mining industry in the United States has been built by individual initiative under our free competitive enterprise system.

We recognize our responsibility to defend this system against every attempt, from within or without, to substitute government control of the lives and activities of our people.

We oppose those social, economic and political ideologies which subordinate the individual to the will of the State.

We believe in equality of opportunity, and that ability and character coupled with hard work, thrift and initiative should be rewarded. This is the essence of the American way of life.

PUBLIC LAND POLICY

The Federal holdings of public land are very large, particularly in the Western States, and are gradually increasing as forest and other reservations are consolidated by acquisition of private property. Public lands, reserved and unreserved, continue to be highly important potential sources of metals and minerals. Exploration for and development of mineral properties in these lands require a liberal, sympathetic and constructive administration of the mining laws.

The American Mining Congress sees no reason to change the policy it has approved for many years with respect to the disposal of mineral bearing lands in the United States. We oppose the suggestion emanating from high sources that discrimination should be made against the mineral locator as compared with other appropriators of the public lands. We oppose the suggestion that surface rights and mineral rights should be separated, and that the rights of the miner should be administered as against the surface claimant by Federal administrative agencies. We urge, on the other hand, more expedition in processing patent applications. A mineral patent once granted should convey as complete title to the land (subject only to extralateral rights of adjacent mineral claimants) as any other form of patent. Severance of surface and mineral titles is impracticable. We oppose and deprecate fraud at all times in mineral locations and any other form of public land appropriation. The proper forum for the determination of charges of fraud is a court, not an administrative department.

We enumerate our answers to specific proposals that have been made and are now being urged throughout the country by representatives of the United States Bureau of Land Management:

(1) *To abolish moratoria on assessment work:* We have advocated this for several years and reiterate our advocacy of such abolition.

(2) *To increase the amount of required annual labor:* There may be merit in the argument that $100 will not produce the amount of mine development in 1949 that it would have produced in 1939, although the $100 requirement has never been more than a token evidence of a locator's good faith. We believe, however, consideration should be given to the fact that the Federal Government's take in taxes from everything the miner produces increases his burden and risk to an extent that may well offset the proposed increase in the annual labor requirement; and this requirement should not be increased.

(3) *To require applications to be made for patent:* We oppose discriminatory pressure on the miner as compared with other classes of land claimants in the matter of making final proof of right to patent. We submit that increases in applications for mineral patent will unquestionably take place with the abolition of moratoria on assessment work, if the Bureau of Land Management and the Forest Service will liberalize their requirements as to what constitutes a mineral discovery as a basis for valid location and patent, and will expedite processing of applications so that the present interminable delays in departmental proceedings may be cut down.

(4) *The doubt as to mineral titles:* We do not concede

that a serious doubt exists. It has been suggested that all claims be recorded in the District Land Office, as well as the county recorder's office. The objection is that, once recorded in the District Land Office, the block books will be perpetually clouded with locations which may have no legal validity. The present law in practically every State requires county courthouse recording, and all public land States should have such law. Paper conflicts with old abandoned claims there are harmless.

(5) *To authorize geological and geophysical locations:* We recognize that there may be a legitimate argument for affording a prospector a prior right to make mineral locations in an area which he selects for geological and geophysical examinations, in a search for ore bodies hidden under lava caps, washes, and other overlying formations. Just what is required in the way of such a priority area is not yet clear. Developments of geophysical surveys in the next few years will better indicate how large an area is required. No immediate change in the law seems necessary for this purpose.

(6) *To abolish the extralateral right and the distinction between lodes and placers:* We oppose this proposal. It could only create confusion in titles. Possibly if geological and geophysical locations are authorized by law they should be limited to vertical boundary planes. Accurate ascertainment of an apex in such locations would obviously be difficult. As to other locations, existing extralateral conflicts have been so far adjudicated that they have practically disappeared from the court calendars. An attempted abolition of the extralateral right in general would only give rise to further litigation to determine which rights are vested and which are not. Abolition of present differences in the maximum legal areas of lode and placer claims would be ill-considered and objectionable.

(7) *To sell outright small tracts:* We approve this in principle. The 5-acre limit proposed by the Bureau of Land Management is not unreasonable. In such cases public bidding should not be required and the right to purchase should be limited to adjacent owners.

(8) *To avoid interference with other land uses:* The lode location perfected and patented vests a complete title in the owner to the surface as well as to the mineral in the land (subject only to extralateral rights of adjacent claims). We oppose the suggestion that this ownership be severed and that the Bureau of Land Management be given authority to award the surface or such portion thereof as it deems advisable to claimants for other land uses. The interference with the miner by persons seeking to cut timber which is necessary for fuel and for timbering of the miner's workings; the interference by persons desiring to cultivate areas which may be necessary at some future date for mine buildings, employees' lodging houses, dumps, mill sites, and other structures, the need for which may not be apparent at or before the date when patent is granted; the perpetual conflict with grazing claimants over injury to livestock and with farmers over stream pollution; interference with irrigation and surface use needs—all these certain conflicts indicate the desirability of maintaining the present complete surface title which goes with the mine patent.

(9) *To abolish fraudulent and nuisance location:* We do not support fraudulent locations in any respect, but we do say that the forum in which the issue of fraudulent claims should be tried is not the Bureau of Land Management. It is in the courts constituted for that purpose. A mineral locator, charged with fraud, should have his day in court before a judge, not before an administrative bureau. The same comment is made with respect to what the Bureau terms "nuisance locations"—that is, locations made solely for possessory rights along public highways or to block public access to national monuments, etc. Such claims can be invalidated at any time by proper judicial proceedings. The abolition of these nuisances does not require a change in the mining laws. It requires merely an enforcement in the courts of the existing public land laws by the officials charged with their enforcement.

(10) *To protect the public interest:* We oppose the position of the Bureau of Land Management which favors bureaucratic separation of mineral rights from surface rights, bureaucratic administration of mineral extraction, bureaucratic determination of issues between the surface owner and the underlying mineral owner, and bureaucratic interference with the traditional miner's right which has been recognized by the laws of this country ever since 1866. If a mining claim in addition to mineral values has other available uses, the locator or patentee should be entitled to use his claim for all available purposes. The existence and discovery of the mineral should determine the character of the patent, but should not be a limitation of lawful surface uses either before or after patent.

We oppose the transfer of the Bureau of Land Management to the Department of Agriculture as proposed by the Hoover Commission; this could lead only to further complications in the filing of mining claims and their adjudication, as well as to the creation of problems for the Bureau of Mines and Geological Survey which would remain in the Interior Department.

On the other hand, we favor the Resources Task Force proposals that the Forest Service be transferred to the Interior Department, that a Forest and Range Service be created, absorbing the land administration functions of the Bureau of Land Management, and that the Geological Survey be given the function of determining the sufficiency of the mineral discovery where patent has been applied for.

For mineral location, we again urge opening of unused military reservations, power site withdrawal areas, and other territory in Alaska and elsewhere now closed, except national parks and monuments and lands required for secret defense and active military training, testing and other operations. New withdrawals and reservations of public land should be held to a minimum essential to national defense unless authority for exploration for and development of minerals is continued in the withdrawal order.

Excessive royalties under government mineral leases of lands subject to leasing under existing laws are contrary to sound conservation principles, and are objectionable.

We continue to oppose any cession to the various States of the Federal public lands, reserved or unreserved, other than tidelands.

We are fully cognizant of the problem of clearing from the block books overlapping entries, locations used for other than bona fide mining operations, and other conflicting claims, but we insist that the courts have the power to adjudicate these cases, most of which are beyond effective administrative decision and should be resorted to alike by the Government and the locator claiming prior rights.

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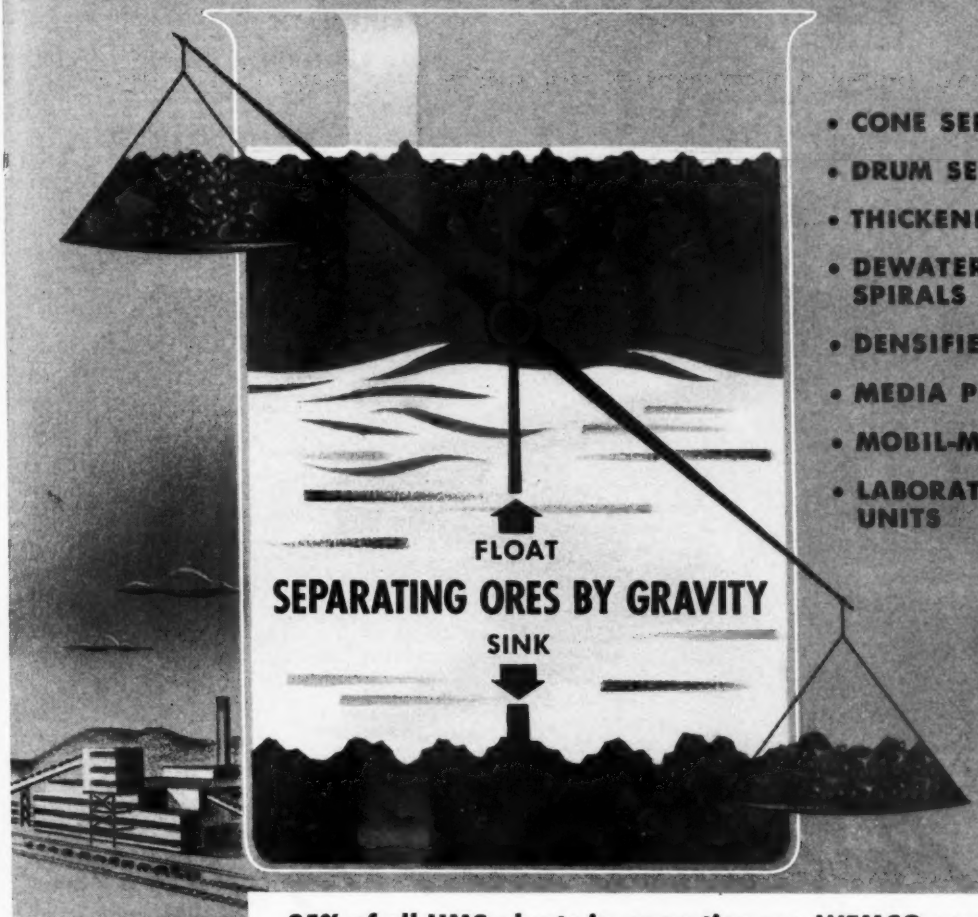

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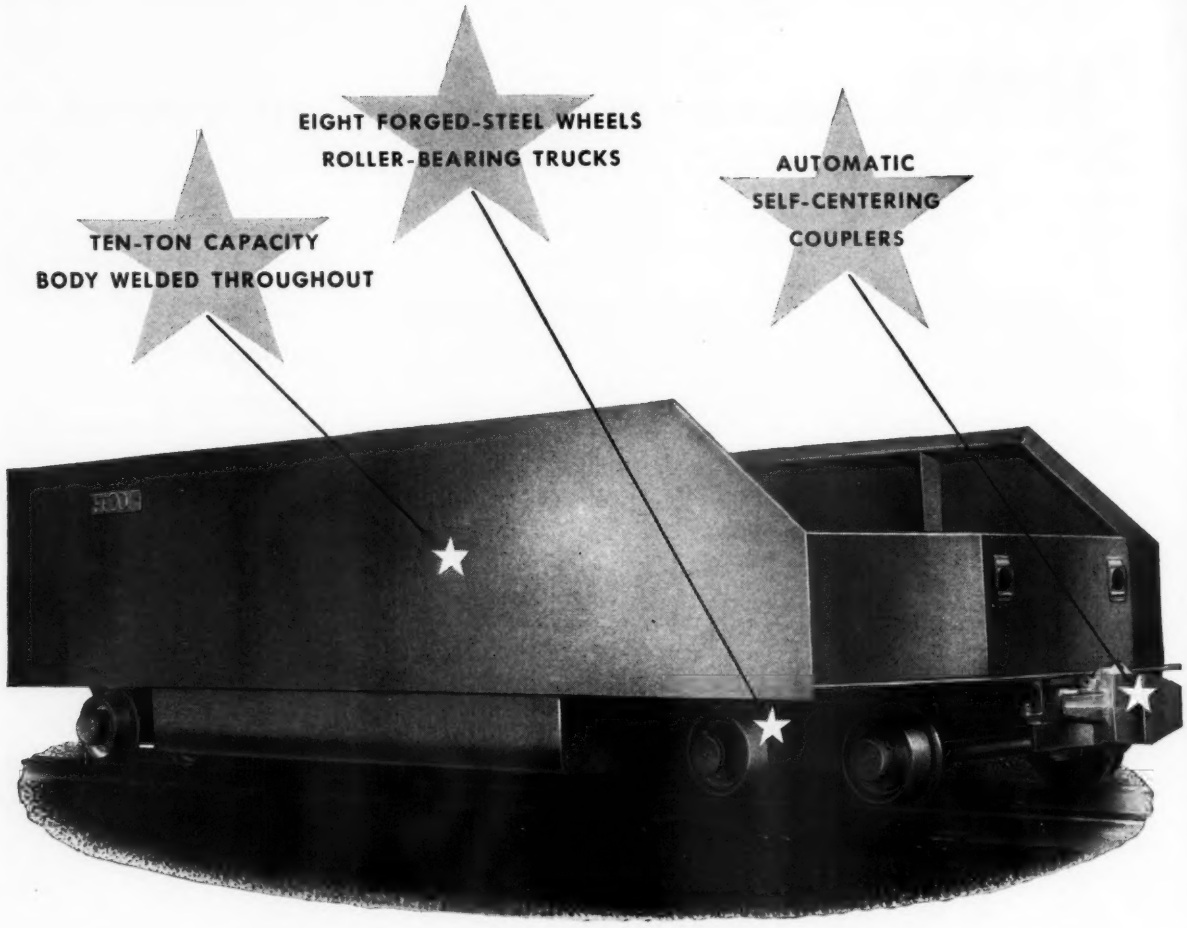

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As Viewed by A. W. DICKINSON of the American Mining Congress

OCTOBER 19 brought adjournment of the 290-day first session of the 81st Congress with a record peacetime spending authorization of $46,500,000,000. Faced with deficit estimates ranging up to $8,000,000,000 for the current fiscal year ending June 30, 1950, the White House called for an increase in taxes in 1950. Sharp counterstatements came from Senator George, Chairman of the Finance Committee, and from Representative Doughton, Chairman of the Ways and Means Committee, that Congress should cut Government spending and amend the revenue laws to encourage venture capital and business expansion.

Partial settlement of the steel strike and the order returning coal miners to work for the rest of November alleviated growing unemployment and an economic crisis.

Incentive Payments

The adjournment left the O'Mahoney Mine Incentive Payments bill, S. 2105, discussed in the October JOURNAL, pending before the House Committee on Rules, following an attempt at House passage under suspension of the rules, which failed 176 to 118—less than the two-thirds majority required.

One member of the Rules Committee, Representative Eugene Cox of Georgia, took issue during the House floor debate in the following words: "Bringing up this bill under suspension of the rules is shocking to me. It violates what I understand was an agreement to let this measure pass over until the beginning of next year. The Rules Committee has not capriciously turned down an application for a rule. It has patiently and sympathetically heard all that the advocates of the measure have had to say. When last before the Committee, during the latter part of the week just passed, the Committee passed up this matter with the understanding that it would be taken up in January, which I was assured was satisfactory to Members of Congress urging the legislation and to representatives of the small miners who would be benefited thereby. It has none of the characteristics of such an emergency as that the situation would be aggravated by the matter going over until January, when it could be taken up in an orderly sort of way—in a manner that would give Members of the House an opportunity to impress upon the measure their views."

Various Congressmen urged passage of S. 2105, declaring that the measure was necessary to prevent the loss of mines and the growing unemployment in mining communities. These included Representatives Case (Rep., S. D.); Engle (Dem., Calif.); Lemke (Rep., N. D.); Short (Rep., Mo.); Bennett (Rep., Mich.); Engel (Rep., Mich.); Sabath (Dem., Ill.); Peterson (Dem., Fla.); and D'Ewart (Rep., Mont.).

D'Ewart made a strong plea emphasizing that, "Our mining industry in this country finds itself in a serious condition. Hundreds of mines have closed down, and thousands of men are out of work. This situation is brought about by various causes, but it is a fact that has to be faced. . . . This bill will help certain of the mines that produce strategic materials to be maintained in a stand-by condition until a more sound solution can be found for this serious problem. The sponsors of this bill admit that it is not the solution they would like to bring before this House, but we face a very critical situation in the industry, and this seems to be the only solution that will be acceptable to the Administration and that can be passed at this time."

In connection with another incentive payments bill for manganese production now pending before the House Committee on Armed Services, Major General Timberlake, staff director of the Munitions Board, has written to the Committee Chairman stating in part: "If the Congress determines to subsidize any domestic mining industry or industries, any substantial encouragement or interest in mining and of mining exploration resulting therefrom would be of benefit to national security, and any resultant increased production of critical materials should be made available to the national stockpile at not more than current market prices.

"Subsidy activities, however, should be otherwise kept separate and apart from stockpiling. No such program should be inter-related with the stockpiling function in such a manner as to make purchases for the stockpile mandatory, since the determination of the amounts, and the quality of materials, to be stockpiled should be made entirely on the basis of national defense needs."

The report opposed the manganese bill, H. R. 2767, because it would commit the Government to purchase submarginal concentrates and ores, thereby increasing the administrative burden, expense in handling, beneficiating and processing to meet specifi-

Washington Highlights

CONGRESS: Adjourned October 19; reconvenes January 3.

INCENTIVE PAYMENTS: Bill goes over to next year.

STOCKPILING FUNDS: Congress restores $175,000,000 cut.

PERCENTAGE DEPLETION: Senator George foresees study.

DELIVERED PRICING: Further consideration next session.

WAGE-HOUR: President approves amendments.

COAL CONTRACT: Miners back to work.

cations, and might throw the stockpile out of balance.

Stockpiling Funds

As the result of House conferees standing firmly for the $275,000,000 contract authority for the procurement of materials for the National Defense stockpile, the Senate conferees on the Armed Services Appropriations bill receded and accepted a compromise amount of $175,000,000. As matters now stand, the Munitions Board has available for the current fiscal year a total of $565,000,000 in direct appropriations and $420,000,000 in contract authority.

While the report of the conferees was under debate on the House floor on October 18, Representative D'Ewart made a strong plea for the exercise of the "Buy American" provision in the Strategic and Critical Materials Stockpiling Act of 1946. The manager for the House conferees replied to D'Ewart that the Conference Committee "expects that the 'Buy American' law will be strictly adhered to." This is a matter of real interest to domestic producers of metals and minerals.

Percentage Depletion

During Senate Finance Committee consideration of a House-approved measure amending certain revenue law provisions, not in themselves of interest to mining, Senator Ed Johnson of Colorado placed perlite and diatomaceous earth in the bill to receive percentage depletion at 15 percent of the gross income from the property. In the course of debate on the Senate floor Senator Kem of Missouri added tripoli, granite, marble, borax mines and deposits, sand, gravel, stone, calcium and magnesium carbonates, and all other nonmetallic clays and minerals. Senate-House conferees dropped all of these minerals covered by the Johnson and Kem amendments.

Chairman Walter George of the Senate Finance Committee said that both the House and the Treasury objected to the depletion amendment, and added that the whole question of percentage depletion would be studied by the Senate Finance Committee and the House Committee on Ways and Means within the first three months of 1950.

The Senator explained further, "It may be said in all frankness that many of the metals and minerals, or at least some of them, included in the amendment do not require discovery effort. They are plain and obvious, and they simply have to be mined or extracted from the deposits. As to certain other of these materials, we had no real evidence as to whether other competing minerals and metals have been given a percentage depletion allowance."

Delivered Pricing

Further Senate consideration of the O'Mahoney Delivered Pricing bill, S. 1008, was put off until January 20 in the last hours of the congressional session, on motion by Senator Douglas of Illinois. Douglas had spoken against approval of the conferees' report, which had received House sanction by a vote of 200 to 104, and Senator Long of Louisiana had announced his intention to debate the issue at length.

Under the conferees' agreement a seller acting independently could absorb freight "except where such absorption of freight would be such that its effect upon competition will be to substantially lessen competition." It was further provided that the defense of good faith in meeting competition "shall not make lawful any combination, conspiracy, or collusive agreement; or any monopolistic, oppressive, deceptive, or fraudulent practice."

Wage-Hour

On October 26 the President signed the bill carrying the Fair Labor Standards Act amendments of 1949. The law will become effective in 90 days and raises the minimum wage from 40¢ to 75¢ an hour.

It is estimated that the new law will remove up to a million employes from the coverage of the Act. Improvements in the administrative provisions include restrictions on its application to employes not directly essential to production; limitations on the Administrator's authority to bring suits against employers; affirmation of the principles of the Portal-to-Portal Act, and the two-year statute of limitation; and elimination of "overtime-on-overtime" through redefinition of the term "regular rate of pay."

Coal Contract Negotiations

At this writing, Federal Mediator Cyrus Ching has called joint talks between UMWA president John L. Lewis and representatives of southern, "captive," and northern and western coal operators in an effort to pave the way for arriving at a new coal contract.

Prior to this move, negotiations between operators and the union at White Sulphur Springs and Bluefield collapsed because no progress was being made towards a new contract. Northern and western operators broke off negotiations on October 21. Their spokesman, George H. Love, in announcing the break-off of negotiations, said: "We have offered to renew our present high wage contract, if the union leaders will give us assurance that we can give our employes work every day business is available. The employes want these high wages under this contract, which Mr. Lewis only last year boastfully declared was the best labor contract ever negotiated. We want to serve our customers. One man prevents this. We have made our best and final offer for the hundreds of operators we represent. Under the circumstances, remaining here longer would only make the operators a party to fooling the miners, who mine the coal, and the public who buys it.

"When the union leaders show some disposition to consider our employes and the industry on which we all depend, we will meet with them again at a mutually satisfactory place and time."

Southern operators terminated their contract talks on November 2, and their spokesman, Joseph E. Moody, told reporters: "The union representatives are not willing to bargain seriously with us, except on their own terms. We have offered the same wages and hours as in the old contract. Two other major differences of position have been the matters of the setting up of standards for the welfare fund, and the control of production of our mines by the union. Our proposals have been given little consideration and there has never been the slightest intimation that any of them would be accepted by the union.

"The union attitude amounts to an ultimatum which we cannot accept and which makes further negotiations at this time fruitless and useless."

Meanwhile, Lewis summoned his Policy Committee to a meeting in Chicago on November 7 for the purpose of hearing reports of negotiating representatives and to develop further strategy. As a result of this UMWA session, Lewis, in a surprise move on November 9, ordered the miners east of the Mississippi River back to work until midnight, November 30, under terms of the old contract. He said this was done as an "act of good faith, designed to contribute to public convenience."

Lewis made two unsuccessful efforts to split the ranks of the coal industry and negotiate separate contracts with Indiana and Illinois producers. Governors of both States urged him to terminate the strike to alleviate further public hardship and he offered to negotiate with the producers. Both Indiana and Illinois producers rejected his proposal, stating that the issues involved were of a national character, and that the miners should return to work under the old contract pending final settlement of national negotiations.

Meetings with Ching may be a prelude to some form of White House action, according to reports, but at this writing President Truman has not indicated the course he might follow.

In the midst of these moves, the U. S. Supreme Court upheld the $1,420,000 in fines imposed upon Lewis and the UMWA by Judge T. Alan Goldsborough during the 1948 strike.

AMC Personals

Louis Buchman, general manager of the Utah Mines Division, Kennecott Copper Corp., has been named general manager of Kennecott's western mining division, according to an announcement by **J. C. Kinnear,** vice-president. From headquarters in Salt Lake City Mr. Buchman will direct activities of the Utah Copper division, Nevada Mines division, Chino Mines division and the Ray Mines division of the company.

Louis Buchman

P. R. Paulick, consulting engineer, Library, Pa., has recently returned from Japan where for the past six months he has been serving as special mining engineer and consultant on the rehabilitation of Japanese coal mines. This work was under the auspices of SCAP. Mr. Paulick was engaged in consulting work in Nova Scotia and returned home early in November.

Howard I. Young, president, American Zinc, Lead and Smelting Co., recently announced that **John N. Marshall** was elected a director of the company to fill the vacancy created by the recent death of Hayward Niedringhaus.

James E. Decker, Rainelle, W. Va., is secretary-treasurer of the Greenbrier Coal Operators Assn.

Ernest F. Goodner has been elected president of the American Gilsonite Co. **Roy E. Nelson** was named assistant to the president.

Evan Just, who has been serving for more than 16 months as director of the Strategic Materials Division of ECA, is returning to the editorship of *Engineering and Mining Journal.* He was succeeded by **Charles H. Burgess,** mining consultant and geologist, who has been deputy director since October 1948. Mr. Burgess worked for the Anaconda Copper Mining Co. as a geologist and was superintendent of the Quartz Hill Mining Co. in Montana.

William B. Ross, formerly vice-president of Philadelphia Coke Co. since 1946, has been elected president of the company. He succeeds **William H. Earle** who has been elected a vice-president of Eastern Gas and Fuel Associates in charge of engineering and technical and commercial research.

Lee B. Carroll has been called back by stockholders of Kaaba Silver-Lead Mines, Inc. to resume the office of secretary-treasurer and general manager.

Consolidation Coal Co. (Ky.) has promoted **Richard W. "Dick" Storey** from assistant to chief engineer, at Jenkins, Ky.

Roy Hatch, formerly superintendent of mills for Utah Copper Division, Kennecott Copper Corp., has been promoted to assistant general manager.

L. A. Shipman, combustion engineer, Southern Coal and Coke Co., is the 1949 recipient of the Percy Nicholls Award sponsored jointly by the AIME and the ASME "for notable scientific and industrial achievement in the field of solid fuels."

Thomas P. (Josh) Billings, consulting mining engineer for the United States Smelting Refining & Mining Co., has resigned after 43 active years in the mining industry. For the last 20 he was associated with the United States Smelting Refining & Mining Co.

John L. Auch, vice-president, Pittsburgh Consolidation Coal Co. resigned October 4 to accept a position as vice-president of the Great Lakes Pipe Line Co., Kansas City, Mo.

Anton Gray was elected president of the Quebec Iron & Titanium Corp. to succeed the late Russell J. Parker. Mr. Gray is a vice-president of Kennecott Copper Corp.

John M. Connors, long associated with the Allegheny Pittsburgh Coal Co., Windsor Power House Coal Co., and the West System Power Co. as general superintendent, has been appointed vice-president of the Allegheny Pittsburgh Coal Co., and vice-president and director of the Windsor Power House Coal Co.

J. J. Sullivan, Beaver county, Utah, has been retained as mine superintendent of Sunshine Gold Mine, near Redding, Shasta county, Calif. **Morgan Evans,** formerly with the Anaconda Copper Mining Co., has been employed as master mechanic.

Paul Gill has been appointed chief mining engineer of the operating properties of the Clearfield Bituminous Coal Corp. **C. C. Watson** has been appointed land development engineer.

John E. Allen, formerly geologist with the Oregon Department of Geology and Mineral Industries and later associate professor of geology, Pennsylvania State College, has accepted a position of head of the Department of Geology at the New Mexico School of Mines at Socorro.

Howard E. Lohmann, treasurer of the Ayrshire Collieries Corp., has been elected president of the Indianapolis Control of the Controller Institute of America. **Lee G. Lowe,** controller and assistant secretary-treasurer of the DeBardeleben Coal Corp., was elected vice-president.

Howard E. Lohmann

Frank Plughoff has been elected president of the Blaine county chapter of the Idaho Small Mine Operators Association. **Art Jensen,** Snoose Mining Co., was elected vice-president; **Jack Lanning,** Apache Mines, secretary, and **Harry Putzier, Harry P. Janye, Frank Parke** and **Thornley Williams,** were elected directors.

John W. Newett has been appointed chief engineer of the New Cornelia Branch of the Phelps Dodge Corp., Ajo, Ariz.

Fred H. Haggerson, president, Union Carbide and Carbon Corp., was awarded the 1949 medal for the advancement of research presented at the annual banquet of the American Society for Metals.

Fred S. Mulock, general manager of western operations for United States Smelting, Refining & Mining Co., will advance to the presidency of the company effective February 1, 1950. **W. C. Page**, now assistant general manager of western operations, will take over his new duties as general manager of western operations on January 1, 1950.

Fred S. Mulock

Richard Harte, director of the Chicago, Wilmington & Franklin Coal Co., of the National Industrial Conference Board, and of the Baltimore & Ohio Railroad, was recently elected a director of National Steel Corp.

W. L. Anderson, who resigned from Emperius Mining Co. last year, is now general superintendent for the Vanadium Corporation of America at Durango, Colo.

Joseph B. Burns, former superintendent of the Harris mine of the Colorado & Utah Coal Co., has been appointed manager of mines for the Red Wing mine, Colowyo Coal Co., Axial, Colo.

W. C. Lubrecht, Bonner, Mont., general manager of the lumber department of the Anaconda Copper Mining Co., retired recently after 52 years of service with the company. **H. F. Root** succeeded him.

Frank C. Francis has been elected president of the Maple Creek Coal Co.

Dr. George J. Grunenfelder, assistant superintendent of the zinc plant at the Great Falls Reduction Works has been appointed professor of metallurgy at Montana School of Mines. He succeeds **Professor John P. Spielman**, who resigned to become dean of the School of Mines at the State College of Washington, at Pullman.

Luther S. Safriet, general manager, Gatliff Coal Co., recently retired, has been honored for his long standing personal safety record as an employe and official in the production of 13,500,000 tons of coal over a period of 48 years without suffering a lost-time accident. On behalf of the Joseph A. Holmes Safety Association, C. H. Dodge, engineer-in-charge, U. S. Bureau of Mines, Jellico, Tenn., presented Mr. Safriet with a certificate of honor.

William J. Coulter, formerly general manager of the Climax Molybdenum Co., has been elected vice-president of the company.

Frank Woodruff was recently appointed general superintendent of the Mount Hope iron mining division of the Warren Foundry & Pipe Corp., Wharton, N. J. He succeeds the late Harry Davenport.

J. H. Reitz, formerly assistant manager, northern coal mine district, Republic Steel Corp., has been appointed manager of the district following the resignation of **James L. Hamilton**. Mr. Reitz will be in charge of mining operations at ten Republic mines in western Pennsylvania, West Virginia and Kentucky.

Richard G. Smith has been elected president of the Natomas Co. He succeeds the late Senator Thomas McCormack, who passed away in August. Mr. Smith has been with Natomas for 37 years and has been superintendent in charge of all dredging operations.

Harold Wickey, formerly division superintendent for Consolidation Coal Co. (W. Va.) at Fairmont, is now general manager for Pennsylvania Coal and Coke Co.

—*Obituaries*—

Crispin Oglebay, 73, chairman of Oglebay, Norton & Co., died on October 23. Following graduation from Yale in 1901, Mr. Oglebay was a clerk for the Swift Packing Co. In 1903 he was secretary of the Hoffman Hinge & Foundry Co. in Cleveland, and was elected president when the firm became the Ferro Machine & Foundry Co. In 1924 he succeeded his uncle, the late Col. Earl W. Oglebay, as president of Oglebay, Norton & Co. The company is one of the largest operators of iron properties, Great Lake vessels and dock facilities.

Mr. Oglebay was a vice-president and director of the Castile Mining Co., the Ferro Engineering Co., the Lake Superior Land Co., the Montreal Mining Co., the Northern Land Co., and the Reserve Mining Co. He was president and director of the Fortune Lake Mining Co., the North Shore Land Co., the St. James Mining Co., and a number of other organizations.

John F. Macklin, 66, died on October 10 at Overbrook, Pa. Mr. Macklin had long been associated with the bituminous coal industry, having been president of a number of coal companies operating in central Pennsylvania and northern West Virginia fields.

Alva D. Myers, 77, died October 17 in Tujunga, Calif. Mr Myers was a founder of the boomtown of Goldfield, Nev. Goldfield, laid out in 1903, became Nevada's largest town by 1907. Mr. Myers became a multi-millionaire in 22 months. His Mohawk mine, one of the world's richest, produced ore assaying $20 a pound.

Clifford D. Woodward, 71, chief engineer for the Anaconda Copper Mining Co., died October 26 at Butte.

Mr. Woodward moved west in 1898. He was employed for a telephone company and later at the Highland Boy smelter at Murray, Utah. In 1902 he returned to Great Falls to join the staff of the Boston and Montana smelter and in 1918 moved to Butte as electrical engineer for Anaconda. In 1927 he was promoted to chief engineer in which capacity he directed plans for the Andes Copper Mining Co. operation in South America.

A. B. Brooke, 61, of Charlotte, N. C., died on October 10. Mr. Brooke represented the Pittsburgh Consolidation Coal Co., and previously had been superintendent for Consolidation Coal Co. at Wayland, Ky. He was president of the North Carolina Coal Institute.

Charles Erb Wuensch, 57, died August 27 in San Francisco. Mr. Wuensch had extensive mining experience abroad and in the United States following graduation from the Colorado School of Mines in 1914. He was a key figure in the development of the sink-float process and was active in pursuing many lines of thought leading to improved metallurgical processes.

Charles K. McArthur, 51, widely known metallurgist with the Dorr Co. died October 20 in Seattle, Wash. Mr. McArthur had been with the Dorr Co. since 1926.

Frederick W. Carrick Whyte, 86, head of coal mining operations for Anaconda Copper Mining Co., passed away on September 15.

Joseph D. Cotton, 77, vice-president and director of the Four Wheel Drive Auto Co., died September 23 at Clintonville, Wis. He had been connected with the firm since 1915.

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"Canton" products have upped profits in hundreds of mines with long dependable service, for nearly half a century.

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Operating time	100 hr.
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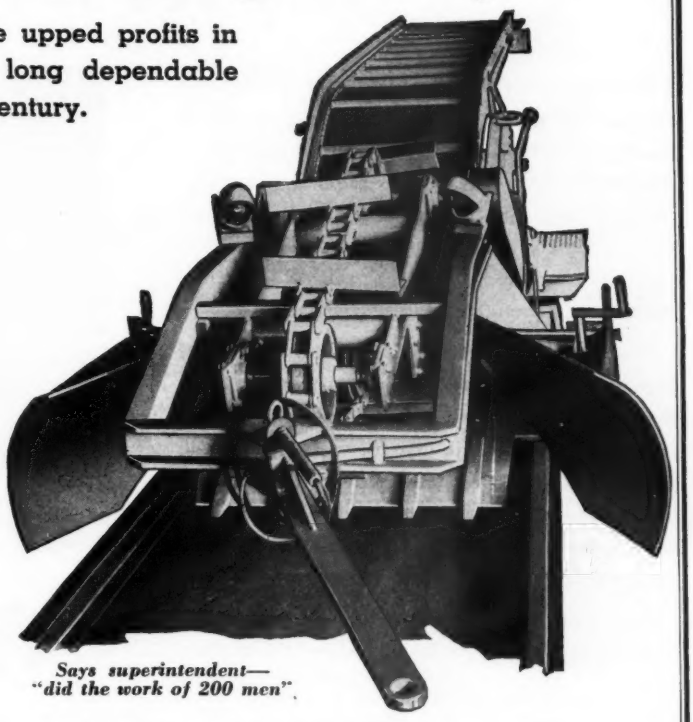
Cost of labor	$412.00
Distance cleaned	27,860 ft.
Cost per foot cleaned	$0.015
Cost per ton loaded	$0.465
Tons loaded	887



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Trips rush through at full speed . . . no expensive stopping and starting . . . more tonnage hauled out . . . no trapper boy accident liability. Activation is entirely mechanical . . . nothing protruding from walls and no electrical servicing.

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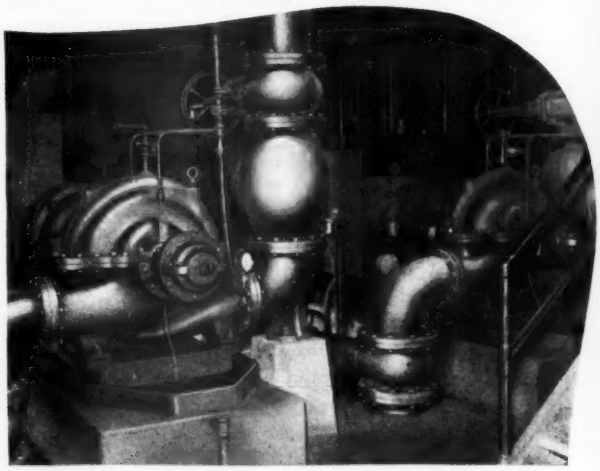

PRIMARY SPRAY PUMPS *in a large breaker plant, featuring Crane Standard Iron Body Wedge Gate and Check Valves.*

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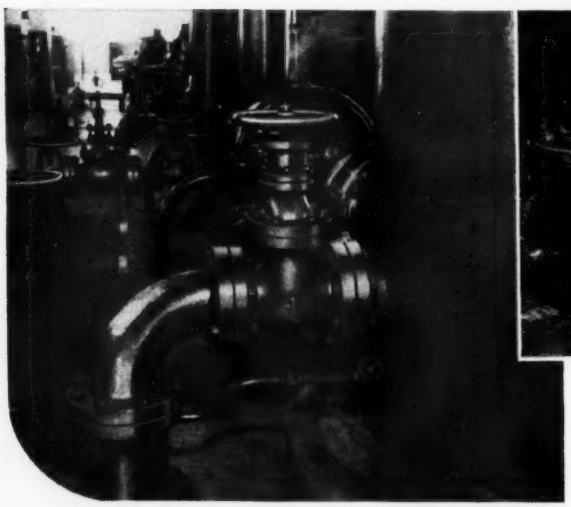
FUEL OIL PUMPS *in boiler room at a copper mine. Valves, fittings, and accessories are from the complete Crane line.*



IN A HYDRO POWER PLANT, *Crane 250-pound Ferrosteel Wedge Gate Valves typify the wide range of materials supplied by Crane for mine operations.*

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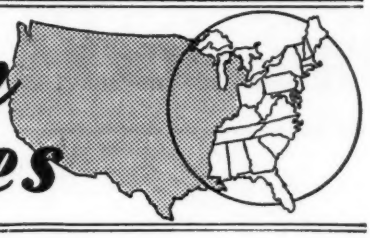

Progress at Wharton Mine

Construction is proceeding at the Wharton No. 2 mine of the Eastern Gas and Fuel Associates at Wharton, Boone county, W. Va. A 720-ft gallery that will carry the mine output from the headhouse downward to the preparation plant is nearing completion. When in production, the modern preparation plants will be able to turn out 4500 tons of cleaned and graded coal daily.

Coking Coal Survey

Marked progress has been made in four eastern states in a nationwide survey of minable coking coals being conducted by the U. S. Bureau of Mines. Eventually the survey will cover all of the nation's coking-coal-producing states and when completed the information found will serve as a guide in developing adequate reserves for use in times of national emergency.

Minable reserves of coking coals in nine counties in central and western Pennsylvania, nine counties in West Virginia, nine counties in eastern Kentucky, and in a few counties in Virginia are being determined by five field teams. Work in these states will continue during 1950, eventually extending to all counties where coking coals are being mined.

At the same time that field surveys are being made, studies are in progress on means of up-grading low-grade coals through preparation. These tests are being conducted in Bureau laboratories at Pittsburgh, Pa.

Coals not widely used for coking but believed satisfactory for metallurgical use are being tested for coking quality. Although most of this work is being undertaken at Pittsburgh, Pa., some of the work on carbonization of coals and coal blends is under way in an experimental coke oven at Tuscaloosa, Ala.

State, Federal and private sources are cooperating in the survey. Mine owners have provided records of diamond drilling, individual mine maps and other information needed for computing coking coal reserves.

Coal Association Elects Officers

At the 1949 convention of the National Coal Association, Ralph H. Knode, president, Stonega Coke & Coal Co., was elected president. W. C. Shank, president, Crowe Coal Co., and E. H. Davis, president, New York Coal Co. were elected vice-president and treasurer respectively. John D. Battle was reelected executive vice-president. Other vice-presidents are George H. Love and Laurence E. Tierney, Jr. James W. Haley was reelected secretary and general counsel, and C. C. Crowe was reelected assistant secretary-treasurer.

The three-day program of the association featured addresses by coal industry leaders.

Rescue Car in Operation

A rescue car to be used in mine explosions, cave-ins, or other disasters, has been placed in operation at Frankfort, Ky., by the Kentucky state police cooperating with the U. S. Bureau of Mines. The car will carry first-aid equipment and be equipped to serve hot coffee to rescue workers.

Coal Properties Tested

Tests of the carbonizing properties of Lower Banner coal from the No. 56 mine at Dante, Va., revealed that this coal will produce metallurgical coke within the range of present specifications. Tests were conducted by the U. S. Bureau of Mines and reported in Technical Paper 720. The coal is found to be relatively low in ash and sulphur. The yields of coke,

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Choose Simplex Mine Jacks for Safety First in all types of mine jacking. In addition you get easier operation, longer jack life and efficiency to lower your cost of lifting.

Check these important Simplex features: Drop forged, alloy steel heat treated parts — Precision machining — Expansion rivets instead of machine screws — Unbreakable trunions — No fulcrum pins — Maximum strength with minimum weight.

Specify Simplex—get the benefit of the superiority which resulted in these jacks being awarded the *only* gold medal for the safety of jacks by the American Museum of Safety.

GENERAL PURPOSE MINE JACKS

Single Acting — Ratchet Lowering

A Jack for every heavy duty mine job—5-to-35 tons capacity. All lift full capacity on cap or on the toe of Jack, a feature exclusive with Simplex!

Adjustable MINE ROOF JACKS

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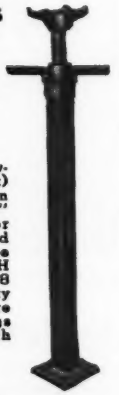
3 Types of Heads

Type "FS" Flat Swivel (on Jack at right) for use with wooden pieces. Type "C" (above left) for square and round timbers, and Type "FF" for small H beams and rails. 8 and 16-ton capacity models with square tubing or fittings only for use with round pipe.



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8 and 16-ton capacities with new type "FL" head—flat with lugs—for square tubing and round pipe. Eliminates the danger of knocking out posts. Enables loading machines to load out full cut. Unnecessary to re-set jack.

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Get this fully illustrated bulletin with detailed information on all Simplex Mine Jacks. In addition to those shown here these include: Post Pullers, Timber Jacks, Electrided Track Jacks, Journal Jacks, Anchor Jacks, Wire Tensioning Jacks, and the Simplex-Jenny Center Hole Hydraulic Puller.

GEARED JACKS 25 and 35-ton capacities. For heavy duty work such as rerailing mine or railroad cars. Built for power, speed, ruggedness.

HYDRAULIC JACKS 3 to 100-ton capacities. Safety tested to 50% over capacity. Easy to operate, vertically or in horizontal position.

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gas, tar, light oil, and ammonium sulfate obtained by coking were about average for coals of this rank. The illustrated report describes the geology and occurrence of the Lower Banner coal and its various properties.

Annual Report Awards

In its ninth annual report survey based on 1948 annual shareholders reports the *Financial World* rated the reports of United Electric Coal Cos., the Pittsburgh Consolidation Coal Co., and the West Virginia Coal and Coke Corp. as best, second best, and third best, respectively, in the coal and coke field.

In the metal mining industry classification the report of the New Park Mining Co. was judged best, and the Kennecott Copper Corp. was second best, with the report of Noranda Mines, Ltd., rated as third best.

Coal Mining Institute Annual Meeting

On December 15 and 16, the Coal Mining Institute of America will hold its 63rd annual meeting at the William Penn Hotel in Pittsburgh. Guest speaker at the annual banquet, which takes place on December 15, will be Charles E. Lawall, assistant vice-president, Chesapeake and Ohio Railway Co., Huntington, W. Va.

Leatherwood Mine Nears Completion

Excellent progress has been reported on Blue Diamond Coal Co.'s new preparation plant at the Leatherwood mine, Toner, Ky. Production is planned early in 1950.

The new plant will have a capacity of 700 tph. Trains of cars coming from the mine will be unloaded directly into a bin that will feed the preparation plant, which is equipped with the most modern and up to date equipment.

U. S. Bureau of Mines-U. S. Geological Survey Appropriations

Early in October, Congress passed the Interior Department Appropriations bill providing $23,987,500 for the U. S. Bureau of Mines, and $15,988,000 for the U. S. Geological Survey. For the principal activities of the Bureau of Mines funds were provided as follows: operating rescue cars and stations and investigation of accidents, $1,200,000; coal mine inspections and investigations, $2,700,000; testing fuels, $621,000; anthracite mining investigations, $420,000; synthetic liquid fuels, $9,750,000; mineral mining investigations, $420,000; investigation and development of mineral deposits, $2,000,000; coal investi-

gations, $261,000; oil and gas investigations, $690,000; mining experiment stations, $1,400,000; metallurgical research and pilot plants, $1,810,000; and economics of the mineral industries, $950,000. The new appropriation Act also provides $500,000 for the U. S. Bureau of Mines to use in control of fires in inactive coal mines; $550,000 for completing the construction and equipment of the lignite research laboratory at Grand Forks, N. D.; and $250,000 in cash and $250,000 in contract authority to enable the Bureau to extend and operate the Leadville, Colo., drainage tunnel.

For the U. S. Geological Survey's major activities there were appropriated funds as follows: topographic surveys, $5,750,000; geologic surveys. $3,500,000; mineral resources of Alaska, $500,000; gaging streams, $4,125,000; classification of lands, $320,000; and mineral leasing, $725,000.

New Mine Reaches Capacity

Operating on the Powellton seam in West Virginia, the Raleigh-Wyoming Mining Co. reached capacity in the operation of its No. 7 drift mine. A daily tonnage of 650 tons is produced with modern mining machinery including loaders, conveyors, and shuttle cars. The mine has a life expectancy of 20 years.

Bituminous Coal Exports Decline

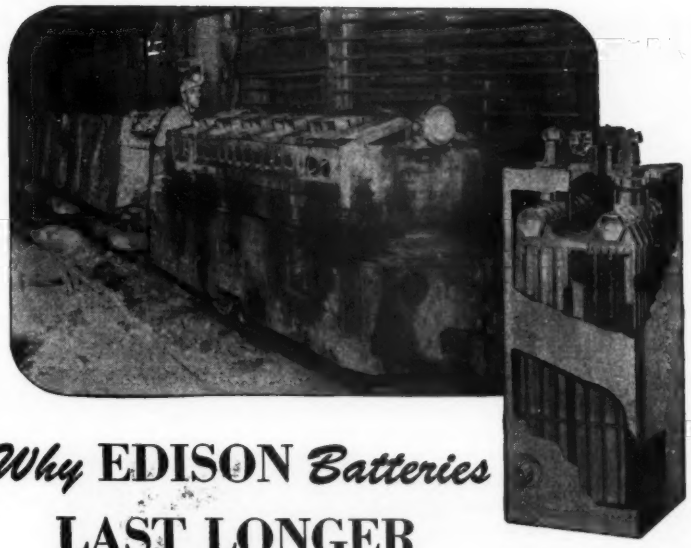
Preliminary figures for the first five months of 1949 show a decline in comparison with the same months of 1948. For the period ending May 31, 1949, the total tonnage of bituminous coal exported was 14,702,170 net tons, against 14,987,181 net tons for the same period of 1948. The largest volume of exported coal went to the North and Central American, and European countries both years.

Exports to Japan have sharply increased; 928,549 tons were received in Japan in the first five months of 1949 as compared with 117,517 tons for the same period in 1948.

Coal Industry Dramatized

The role of bituminous coal in our industrial economy was represented by the Bituminous Coal Institute at the Pennsylvania Week Industrial Parade in Harrisburg, Pa., October 19-26. Other exhibitors included Anthracite Institute, United States Steel, Baltimore & Ohio Railroad, Jones & Laughlin Steel, Westinghouse Electric, American Radiator & Standard Sanitary, and Joy Manufacturing Co.

The coal industry's exhibit included a depiction of the coal miner at work and at home, aspects of the mechanized efficiency of modern mining, and an array of chemical derivatives having their origin in coal.



Why EDISON *Batteries* LAST LONGER

ABOVE: Cutaway view of typical EDISON cell used in mine haulage batteries.

CASE HISTORIES show that EDISON Batteries in mine-haulage equipment have fallen down shafts and gone through many wrecks with little or no damage . . . *and still delivered their full service life!* What is it that enables the EDISON Battery to withstand the most rigorous haulage duty and yet stay on the job year after year?

One of the many answers is its rugged, precise cell construction. Cell containers, covers, pole pieces and other structural parts are made of STEEL. Even the active materials are permanently locked in perforated STEEL tubes and pockets. These in turn are securely assembled into STEEL grids. Every STEEL cover is welded to its STEEL container, proof that no internal trouble is anticipated for the normal life of the cell.

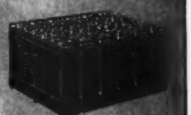
EDISON Batteries last and last, and so through the years cost less and less. If you do not already use them, get price quotations from us. You may find prices lower than you think; cost per year less than you pay now.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION

of Thomas A. Edison, Incorporated, West Orange, N. J.

In Canada: International Equipment Co., Ltd., Montreal and Toronto

Diesel Power Underground

(*Continued from page* 28)

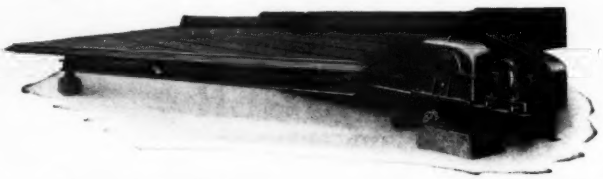
of it. That Diesel is not equipped for underground mining, and any Diesel that is worked underground must have the air-fuel ratio changed to produce the minimum amount of toxic gases; this ratio is about 20 to 1. Diesels must be adjusted for altitude. A Diesel engine, working under proper conditions, will not give off smoke under load, except perhaps a slight haze.

In Colorado and Wyoming there are several Diesel installations that may be of interest. The Horse Creek limestone mine of the Great Western Sugar Co., northwest of Cheyenne, Wyo., is opened by a crosscut tunnel. The haul is about one mile in length with about a half a percent grade in favor of the load. The limestone is loaded from chutes into three-ton, Granby-type cars. Nine cars are hauled per trip. They use two Diesel locomotives; one seven years old and one three years old. Both are adjusted to the proper air-fuel ratio and there is adequate ventilation. You cannot smell the Diesel exhaust gas underground. They haul 1500 tons in eight hours using 16 gal of fuel oil. Their gas scrubber will run without replenishing with water for about six hours, but they replenish it every four hours. In 25 samples of the mine air, not one sample showed a mine atmosphere injurious to health.

The Idarado Mining Co. has an eight-ton Diesel locomotive working the Treasury tunnel at about 10,000-ft elevation. This mine has natural ventilation. About ten days ago the air current was so slack that it was necessary to use a smoke tube to tell which direction the air was moving.

When a trip went out of the tunnel, which has a rather small cross-section, it worked like a piston, and an anamometer would run for about two minutes after the trip left. There was a circulation of air in spite of not having forced ventilation. That arrangement is not recommended as ventilation should be forced. But at Idarado, analyses of the mine atmosphere do not show anything injurious to health. Aldehydes were noticeable in the tunnel and the men complained, not against the Diesel, but about the powder smoke that came out of the stopes.

At the Bureau of Mines oil shale mine at Rifle some 15-ton and 22-ton Euclid trucks powered with Diesel motors are used. They have a Diesel-powered jumbo, Diesel-powered loading platform and a Diesel-powered scaling platform. With apologies to Ed Gardner, the ventilation is substandard and aldehydes are faint to strong most of the time. No scrubbers have been found that will work effectively on trucks of this size under hard duty. However, there has never been an analysis that indicates atmospheres injurious to health. The aldehydes have been the only thing that have given any trouble. In my mind the success of Diesel operation requires ventilation, and you must ventilate if you are going to overcome prejudice. This is not necessarily the opinion of the U. S. Bureau of Mines, but it is my opinion.



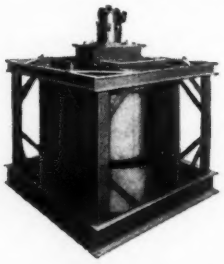
The Diagonal Deck *SuperDuty* Easily Excels in Washing Efficiency

When it comes to producing high grade washed coal in the fine sizes at high capacity and with minimum lost coal in the refuse, the SuperDuty Diagonal Deck Coal Washing Table is far ahead of any other machine or process.

This high efficiency is due in no small part to the diagonal deck which places 75% more working riffles in the direct path of material flow.

Contributing also, are the balanced head motion, overall synchronization for adjustments and table action, the low power requirements and negligible maintenance cost.

For full information write for Bulletin 119.



CONCENCO FEED DISTRIBUTOR

The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine, with motor drive requiring only ¾ H.P. in operation. This distributor effectively provides a splitting of feed into any desired number of equal portions. It is especially suitable for feeding efficiently a battery of coal washing tables.

THE DEISTER★ CONCENTRATOR COMPANY

CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

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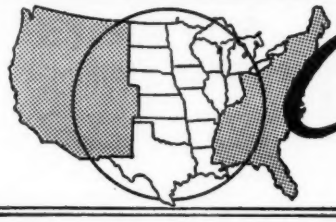
GENERAL MANAGER for large property, South America. Altitude and unusual operating conditions. Young aggressive engineer preferred with background Latin-American operating experience essential. Salary $15,000 annually. Replies strictly confidential. Address Box 445 in care of this publication.



Central States

Education for Freedom

On October 8, 1949, Andrew Fletcher, president, St. Joseph Lead Co., spoke at the dedication of the new school at Herculaneum, Mo. In considering the new facilities that have been made available for the education of the children of that area, Mr. Fletcher spoke of the transition from the "pick and shovel" days of the first mining operation to the present vast mechanical installations of the Lead Belt.

Commenting upon America's great accomplishments, Mr. Fletcher said "The world is today living in a titanic struggle between two conflicting philosophies of life. Call it what you will, Dictatorship versus Democracy, or Communism versus Capitalism. Even this school in Herculaneum plays a part in deciding the outcome of the struggle, for it will teach, I am sure, the inspiring story of the foundation of our Republic and its growth under our free enterprise system. On the other hand, the schools of other countries, to varying degrees, will reflect the opposing philosophies. You and I, and our children are the ones who will decide whether we wish a continuation of the American way of life, as reflected in our schools, or that being offered in other lands."

Education was stressed by Mr. Fletcher as an essential requirement for every American to assure him a fair start in life and provide the mental foundation from which he can see the fallacies of the propaganda of class hatred.

Illinois Mining Institute Meeting

At the 57th annual meeting of the Illinois Mining Institute, held at Springfield, Ill., on October 28, more than 740 members were present. On the morning session, Robert Fletcher, J. H. Fletcher & Co., spoke on loading and transfer points for belt conveyors. A. B. Crichton, Jr., assistant to the president, Johnstown Coal & Coke Co., described the tests his organization is making with stainless steel conveyor belts.

The importance of coordinated mine accounting was stressed by J. W. Broadway, secretary, Bell & Zoller Coal & Mining Co. A. Lee Barrett, research engineer, Joy Manufacturing Co., traced new developments in continuous mining.

On the afternoon session cleaning plant operation and control was the subject of a talk by Robert N. Morris, preparation engineer, Sahara Coal Co. L. E. Briscoe, electrical engineer, Ayrshire Collieries Corp., discussed electric power distribution cable faults. He was followed by H. R. Stoddard, Chicago district engineer, Simplex Wire & Cable Co., who outlined fault location methods and equipment. The afternoon session closed with a colored motion picture "New Modern Developments in Connection with Strip Mining," presented by the United Electric Coal Cos.

At the annual banquet new officers were elected as follows: T. G. Gerow, Truax-Traer Coal Co., president; G. S. Jenkins, Consolidated Coal Co., vice-president; and B. E. Schonthal, secretary-treasurer.

Honorary life memberships in the Illinois Mining Institute were awarded to B. E. Schonthal, Fred S. Ffahler, Paul Weir, and John E. Jones. Also, in recognition of 20 years' service as the Institute Secretary, Mr. Schonthal was presented with a testimonial booklet suitably inscribed and carrying the signatures of 779 Institute members. Helen Brail, who has handled the registration desk at these meetings for 17 years, was presented with a silver monogrammed cigarette box in recognition of her service. Past presidents of the Institute were honored at the banquet and the eleven present were seated at the head table.

Edward A. McFaul, speaker of the evening, gave those present at the annual banquet a great deal to think about in his address entitled "So You Think You're Slipping?"

Drilling Program Completed

A preliminary diamond drilling program was recently completed on the Magoffin reserve, Aitkin county, Minn., on the eastern extension of the Cuyuna iron range formation. The property is a state lease owned by the Glen Development Co., and contains a deposit of pyrite and pyrrotite. The Iron Range Resources and Rehabilitation Commission of the State of Minnesota financed the drilling.

NO SIDETRACKS ON THE "AIR EXPRESS"
WITH
Fulton
FAMOUS FIREPROOF
BRATTICE CLOTH
Give fresh air a fast right of way! No sidetracking in open tunnels with tough, dependable fire-resistant Fulton Brattice Cloth to keep fresh air moving to its destination.
Fulton Brattice Cloth comes in both standard and extra-heavy weights and in widths from 36 to 96 inches. It successfully resists moisture, mildew, fungus, and rot. A sturdy, cloth marker on each easy-to-handle uniform 50-yard roll gives full specifications of the roll.
Ready for immediate shipment through your supply house or from your nearest Fulton branch.
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BAG & COTTON MILLS
New Orleans • St. Louis • Denver
New York • Dallas • Minneapolis
Atlanta • Kansas City (Kansas)
Los Angeles

Garrison Damsite Lignite Stockpiled

The U. S. Army Corps of Engineers is digging and heaping 5,000,000 tons of lignite into the biggest coal piles the world has ever known, each containing a million tons apiece. Mining of this coal is an unavoidable necessity in the building of the Garrison dam across the Missouri river, 70 miles northwest of Bismarck.

The problem of what to do with the coal was solved by V. F. Farry, in charge of the U. S. Bureau of Mines coal experiment station in Golden, Colo. In the normal course of cutting the intake and outlet channels of the dam, forming basins, and excavating 86,000,000 cu yd of material, the Army Engineers were certain to hit three coal seams and 5,000,000 tons had to come out.

A market for the coal would have recovered a part of the cost of the dam, but this would have put the government in the coal business. In order not to waste the coal it is being stockpiled for use by future generations.

For two years, R. R. Allen, fuel technologist, USBM, has been working on practical storage problems. "We have to make these piles breathe properly when barometric pressure changes," says Allen. "Hot spots develop if too much oxygen gets into a given space and then spontaneous combustion starts internal fires. The preventive for that is crushing and packing." The actual technique resembles earth-fill construction. Big carryalls dump the coal on a pile. Bulldozers spread it out evenly, and big sheepfoot rollers follow, crushing the coal and packing it down uniformly. The last of the experimental piles contains a third of a million tons, the largest pile of coal in the world to date. The million-ton piles will be 1000 ft long on a side and 40 ft high with uniformly sloped sides.

RFC Recovery Suit Fails

On the failure of a venture of F. J. Childress & Sons, the RFC sued to recover $75,000 borrowed from the Government for mining purposes. The Federal court ruled that the borrower was not liable as the indenture reads "Each of the notes shall constitute a promise by the trustor to make payment absolutely and unconditionally, but only from the specified sources and securities, of the sums specified in such note, in accordance with the terms thereof."

A similar suit is pending against Clarence Zuvekas, a Joplin, Mo., mining man in which the RFC attempts to recover a loan of $166,000.

DIESEL POWERED PUMPING EQUIPMENT

A Number of 2 Cycle and 4 Cycle Diesel Engines 200 to 750 hp. All Under 300 r.p.m. Geared to Plunger Pumps Handling 420 to 1470 gpm at 750 lbs. on Foundations in Illinois, Missouri, Kansas, and Oklahoma. Will Sell Units Complete or Engines and Pumps Separately.

Priced to allow purchase of Engines or Pumps for Spare Parts

Inquire—Purchasing Agent

STANOLIND PIPE LINE CO.

Box 1979 Tulsa, Oklahoma

Rend-Mar Tipple to be Rebuilt

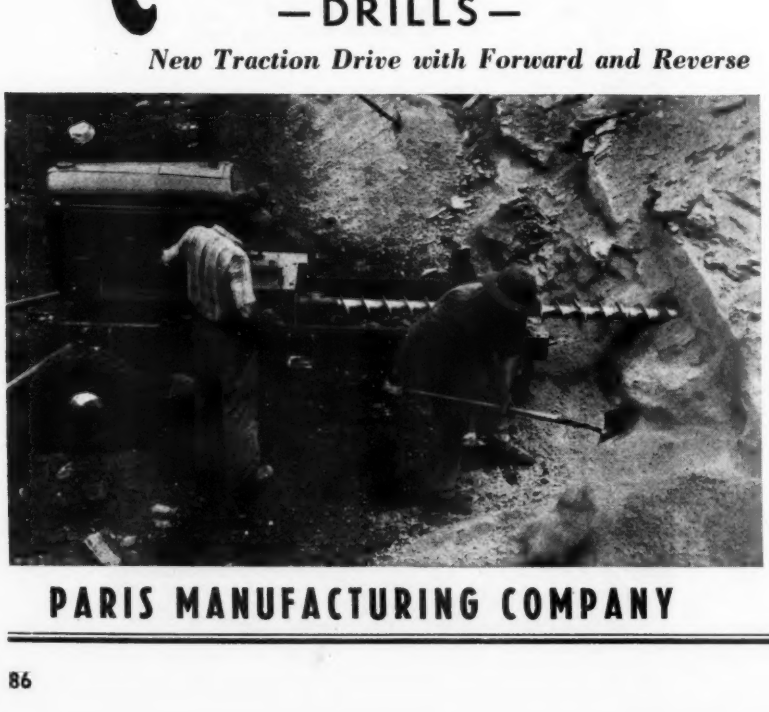
The Sunday Creek Coal Co. has closed a contract with K. Prins & Associates for rebuilding the Rend-Mar tipple which was recently destroyed by fire. A new, two-car rotary dump and belt conveyor will load 200 tph of run-of-mine coal on two tracks. The run-of-mine coal will be prepared

Parmanco

HI-SPEED HORIZONTAL

—DRILLS—

New Traction Drive with Forward and Reverse



Are Delivering

6-INCH SHOT-HOLES READY FOR LOADING AT BETTER THAN A FOOT A MINUTE!

The new Parmanco Hi-Speed Horizontal Drill is completely redesigned around a 40-H.P. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time:—a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition, the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

For BOTH MINES and CONSTRUCTION

•

PARIS MANUFACTURING COMPANY **PARIS, ILLINOIS**

at a new preparation plant at Corning, Ohio.

Another contract with the same organization has been closed for the construction of a river-loading plant, including truck-dump hopper, feeders, picking belts, crusher and barge-loading belt conveyor. The plant will have a capacity to place 2000 tons of crushed coal per day in barges.

Safety Council Appoints Chairmen

At the September 22 meeting of the Lake Superior Mines Safety Council, committees were appointed for the 26th Annual Conference to be held in Duluth, May 18-19, 1950. Committee chairmen appointed were: E. A. Kronquist, exhibits; C. E. Shea, banquet; John A. Johnson, program; R. F. Wilson, registration; and Al Kolu, prize awards.

Nuclear Power versus Coal

Speaking at the 12th annual joint fuel conference of the AIME and ASME at French Lick, Ind., Ward F. Davidson, research engineer, Consolidated Edison Co., N. Y., stated that the present astronomical costs of building and operating an atomic power plant make it unlikely that there will be any rapid large-scale inroads of nuclear power into the picture of industrial power production.

At the most, said Mr. Davidson, nuclear power plants might represent most of the new capacity and thus be a supplement rather than a substitute for power from coal, oil, gas and water. Fundamental design problems, the search for material able to withstand neutron bombardment and radiation intensities existing in a nuclear reactor and the choice of nuclear fuel were listed as problems of the first magnitude that face physicists, metallurgists and engineers.

High-efficiency coal-burning power plants were said to cost about $190 per kilowatt. Mr. Davidson said that it may not be unreasonable to assume that the cost of nuclear power plants will be at least three times those of coal burning stations.

On the subject of operating costs, Mr. Davidson said that fuel costs for the nuclear station would conceivably be far lower, if ample supplies of uranium ores are found and if it is found possible to reduce greatly present costs of reclaiming and reprocessing the partially spent uranium. Under present conditions uranium as a fuel for power plants is much more costly than coal, but at some later date it may become somewhat less expensive. Until there has been extensive experience with nuclear power plants, operating costs including labor, supervision, maintenance and repair are likely to be higher in nuclear power plants than for coal or oil-burning stations.

9 Month Test Shows

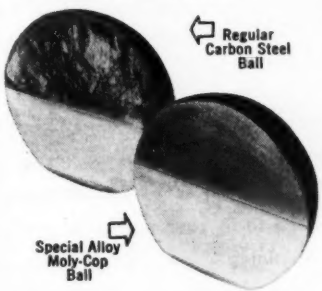
SAVING $32,196.51 ON GRINDING MEDIA with

SHEFFIELD MOLY-COP

TRADEMARK - REG.

COPPER-MOLYBDENUM-ALLOY Grinding Balls

Finer Structure—Hard to the core!



Changing over to Sheffield Moly-Cop Grinding Balls in their six 8'x6' Hardinge Ball mills saved one mining company $32,196.51 on the cost of grinding copper tailings on a 9-months comparison with the cheaper forged balls previously used. The harder, tougher Sheffield Moly-Cop Balls lasted so much longer that less than one-third the pounds of Moly-Cop balls were required.

The economy of Moly-Cop balls in ore reduction has been borne out in reports from all over the world, wherever Moly-Cop balls are used. The harder, finer martensitic structure of Moly-Cop balls, due to the chemical composition of the special alloy and their heat treatment, assure continued spherical shape and longer grinding life. A comparative test of Moly-Cop balls in your own mills will convince you.

The name and address of the Mining Company making the test will be furnished on request.

Carbon and Alloy Steel, Ingots, Blooms, Billets, Plates, Sheets, Merchant Bars, Steel Joists, Structural Shapes, Road Guard, Reinforcing Bars

Welded Wire Mesh, Wire Products, Wire Rods, Fence, Spring Wire, Nails, Rivets, Grinding Media, Forgings, Track Spikes, Bolt and Nut Products

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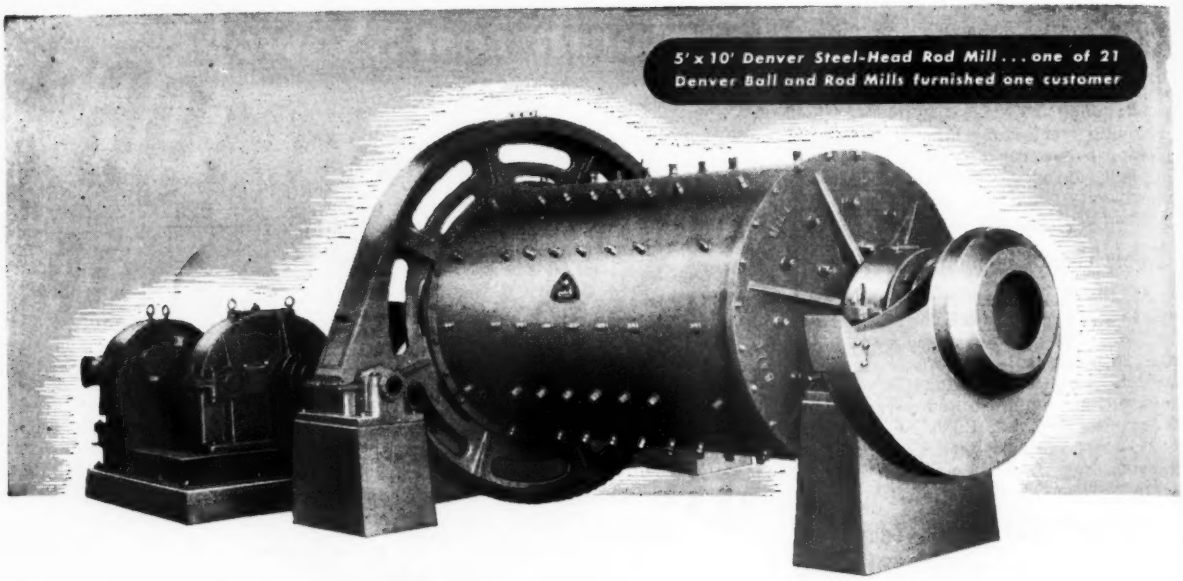

5' x 10' Denver Steel-Head Rod Mill . . . one of 21 Denver Ball and Rod Mills furnished one customer

DENVER *Steel-Head* BALL-ROD MILLS

4-TIMES GREATER STRENGTH THAN CAST IRON

Denver Ball and Rod Mills are made with cast-steel heads integral with trunnions, giving 4-times greater tensile strength than cast iron. Steel-head design permits a choice in type of construction . . . heads may be welded to the rolled steel shell or bolted to a steel flange welded to shell. • With its oversize bearings and extra strength of steel head a Denver Mill may be extended to a length twice the diameter, by addition of a shell section.

DIAMETER MEASURED INSIDE LINERS

Diameter of the Denver Steel-Head Ball-Rod Mills is measured inside liners . . . giving up to 28% greater capacity than mills with diameter measured inside shell.

FLEXIBILITY WITH STANDARDIZED DESIGN

With the standard Denver mills you have a choice of several types of feeders, discharges, trunnions, and drives . . . a combination may be selected to fit your particular problem, without the high cost of specially built mills. • You can depend upon obtaining "Standard—Reliable—Efficient" performance with Denver Steel-Head Ball-Rod Mills...write, now, to any one of the conveniently located Deco offices, for Bulletin B2-B4.

Manufacturer of the **DENVER "SUB-A"** *Flotation Machine...*

STANDARD THE WORLD OVER

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

"The firm that makes its friends happier, healthier and wealthier"

DENVER EQUIPMENT COMPANY

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Western States

New Mexico Miners Plan Meeting

The 1950 annual meeting of the New Mexico Miners and Prospectors Association is scheduled to take place in Silver City, N. M., January 19-21. Joseph H. Taylor is chairman of the general arrangements committee and G. J. Ballmer is chairman of the program committee.

Hull Lease Curtails Operation

Operations on the Hull Lease which operates a portion of the Gem mine in the Coeur d'Alene district of Idaho have reduced production because of the low price of lead and zinc. Some development work will be carried on and only development ore will be milled.

Industrial Health

The First Annual Rocky Mountain Conference on Industrial Health was held at Denver October 31, November 1-2. Specific phases of industrial health programs were discussed by experts in their respective fields. William J. Coulter, executive vice-president in charge of operations, Climax Molybdenum Co., spoke on "Management's View of Industrial Hygiene."

Potash Research

Construction will begin in the near future on a new research pilot plant of the Potash Co. of America, Carlsbad, N. M. At present research work is being conducted in the laboratory and in a small scale pilot plant. The new construction will provide space and equipment to make possible a study of plant problems on a larger scale.

Yogo Sapphire Mine to Reopen

This coming spring the Yogo sapphire mine near Lewistown, Mont., will go into operation with the most modern equipment, it was recently announced by Thomas P. Sidwell, one of the directors of the Yogo Sapphire Mining Co. (See MINING CONGRESS JOURNAL, May 1948). The new corporation has purchased all the property and machinery from the New Mine Sapphire Syndicate, after nearly two years of negotiations. Mr. Sidwell will be general manager, Frank Bryant of Lewistown, engineer in charge and Lloyd Wartes of Spokane, who has made a thorough study of the South African diamond fields, and John Abrams of Los Angeles will be consulting engineers.

Meldrum Tunnel to be Extended

Officials of the Idarado Mining Co. have announced that the old abandoned Meldrum tunnel will be driven more than half a mile further eastward from Telluride, Colo., to tap the famous Argentine vein. Fred Wise of Ouray, Colo., manager for Idarado, said arrangements have been made with the Western Colorado Power Co. to run an electric line to the tunnel. Work already is in progress to improve the road to the tunnel mouth.

The Meldrum tunnel was the dream of Andrew Meldrum. In 1895 he persuaded a group of wealthy Scotsmen to back his project. He wanted to

UP Wins Safety Award

Symbols for national excellence in safety of operations were back in the hands of the Union Pacific Coal Co. and its employes for the tenth time in 24 years. The honors were won for the company by the men and officials of the company's Reliance No. 7 mine at Reliance, Wyo. They were presented to the company in September by top mine officials and Dr. James Boyd, director of the U. S. Bureau of Mines. The symbols consisted of the National Safety Competition's Sentinel of Safety trophy and the Sentinels of Safety flag. They are awarded each year by the Bureau of Mines to a mine in each of six categories having the best safety record in the country. The six divisions are bituminous, anthracite, metal, open pit, nonmetallic, and quarry.

Reliance No. 7 won in the bituminous division. Second honor in that division went to the Union Pacific Coal Co.'s No. 11 mine at Rock Springs, Wyo. Reliance No. 7 had an injury-free record in a total work time of 383,888 man-hours during 1948. The No. 11 mine worked 196,975 man-hours without a disabling injury.

The presentation of the awards and individual certificates to each of the company employes at the two mines were made in an atmosphere of cordiality between management and workers at the Old-Timers hall at Rock Springs despite the fact that the miners were participating in the nationwide mine walkout at the time. Dr. Boyd presented the trophy, a handsome bronze statue of a miner, to I. N. Bayless, president of the Union Pacific Coal Co., who in turn presented individual certificates to William Spence, Reliance mine superintendent, and Leon Wisniewski, machine runner at the Reliance mine. H. C. Livingston, company vice-president, was master of ceremonies. History of the award, which has been given each year since 1925, was traced in an interesting talk by Theodore Marvin, editor and director of the *Explosives Engineer*.

Dr. James Boyd presented Sentinels of Safety award to I. N. Bayless, who accepted on behalf of miners of Reliance mine No. 7, U. P. Coal Co.

It's a Bigger, Better Bonus when you give it in Bonds

It's a *bigger* bonus when you give it in U. S. Savings Bonds. That's because Savings Bonds pay $4 at maturity for every $3 purchased. If it's a $75 bonus, for example, and you give the bonus in bonds, the employee receives—not a $75 Bond—but a *$100* Bond. And he *collects* $100 if he holds the Bond till maturity.

It's a *better* bonus when you give it in Bonds. It encourages saving among your employees—helps to make them more secure, more stable, more contented and productive on the job. (That's borne out in the more than 20,000 companies that make Bonds available to employes through the Payroll Savings Plan!) Another reason is that the more Bonds people hold today, the greater will be tomorrow's purchasing power—without which no business can prosper! Then again, Savings Bond sales aid the nation's economic security by spreading the national debt.

Thus you help your employees, your company, and the good old U. S. A itself—which means *yourself*!—when you give the bonus in Savings Bonds . . . and when you push the Payroll Savings Plan. All the facts and assistance you need are available from your State Director, Savings Bonds Division, U. S. Treasury Department. He's listed in your phone book. Why not ask your secretary to get him for you right now?

The Treasury Department acknowledges with appreciation the publication of this message by

MINING CONGRESS JOURNAL

This is an official U. S. Treasur advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Correction

In the article, "How Safety Maintains Output," which appeared on page 58 of the September issue of Mining Congress Journal, two photographs were published showing the right and wrong ways of riding a conveyor belt. Mr. A. H. Zeilinger, author of the article, wishes to point out that he personally does not approve of personnel riding belts of any industrial type.

drive the tunnel from two directions, from the west, at a point two miles from Telluride, and from Ironton on the east. The tunnel, 22,640 ft long, was to be used both for mining and as a narrow gauge train route between Telluride and Ironton. After driving 2500 ft from the Telluride side and 800 ft from Ironton, support was withdrawn by the Scottish capitalists because of the Boer War.

Uranium Find on Mother Lode

An atomic scientist early in October reported the discovery of radioactive ore in unknown quantities in the heart of the mother lode country. Dr. Frank Tiffany, radiation expert and a former civilian atomic scientist at Albuquerque, N. M., said he found a uranium vein of undetermined depth which measured 400 ft long and 8 in. wide in the high Sierra country near Mariposa, Calif.

Cumberland Mine Unwatering

The Silverton Mining Co. is making good progress in unwatering the Cumberland mine, near White Sulphur Springs, Mont. An 800 gpm deep-well pump and a 300 gpm centrifugal pump are in use. This property was once one of the largest lead and silver producers in the State. Old records indicate that the ore extracted contains 30 percent lead with 16 oz of silver per ton.

Keystone Opens Vein at Depth

Discovery of a gold-silver vein on the 800-ft level of the Keystone mine near Virginia City, Nev., has been announced by W. J. Henley, president of Dayton Consolidated Mines Co. He says the ledge was found by a crosscut driven into the hanging wall near the Silver City fault, and has been exposed by drifting 40 ft. The vein, reported to be the richest found for many years in the Keystone, was located directly beneath the ore body being mined on the 700-ft level.

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New Mexico Fluorspar

According to the Silver City, N. M., office of the U. S. Geological Survey, rich deposits of fluorspar in Grant and Luna Counties will add an important nonmetallic industry to southwestern New Mexico. Currently principal producers are the Burro Chief mine at Tyrone and the H. E. McCray mine near Deming.

Utah Fuel Acquires Oliver Coal

A subsidiary of the Utah Fuel Co., the Calumet Fuel Co., has acquired the Oliver Coal Co., near Somerset, Colo. The Oliver mine is located ten miles east of Paonia, Colo. Production comes from a thick seam and is shipped throughout the Grand Junction-Delta-Montrose, Colo., area. Large amounts are also shipped to eastern Colorado, Kansas and Nebraska.

Silver-Copper Orebody Opened

The Polaris-Silver Summit Mining Co. in the Coeur d'Alene District of Idaho, has opened a silver-copper orebody on the 3200 level, and driven a prospect drift on the ore for 140 ft. Operations were then transferred to opening the vein again by crosscutting from the 3400 level and later the vein will be cut on the 3600 level. The orebody has been developed on the 3000 level for a distance of 800 ft and has a maximum width of 4-15 ft. Concentrates from this ore average from 700 to 1000 oz silver and 18 percent copper per ton.

Nevada Deep Drilling

Deep core drilling in the Hamilton district of Nevada is reported contemplated by major mining interests in hope of locating valuable deposits below the old productive levels. Representatives of several large mining companies have examined maps of the area and inspected old properties in recent months and field engineers of several major oil companies have inspected oil-bearing shales a few miles from Hamilton. Nevada Bureau of Mines geologists have been mapping and investigating mineralized areas adjacent to Hamilton for several years. Their work is said to indicate possibility of existence of important ore bodies below the horizon from which silver ore valued at more than $50,000,000 was mined in the 1870s.

Idaho Uranium Developments

In cooperation with the Atomic Energy Commission the mining companies along the silver belt in the Coeur d'Alene district of Idaho are testing their veins at depth for the presence of uranium ore. Geiger counters have indicated the presence of uranium on the 3100 and 3700 levels in the Sunshine mine, but the strongest indications so far have been in the Coeur d'Alene mines property on the 2800-ft level, where Geiger counter tests were so positive that numerous samples were taken for analysis.

Mining Equipment for Sale

We have the following equipment for sale at our Hocking mine, which is about four miles north of Athens, Ohio:

Joy 14 BU loader.
Joy 32-E shuttle car.
Joy Elevator.
Joy 8 BU loader.
G. E. 10-ton locomotive—42" gauge.
Jeffrey MH-100 locomotive—8 ton.
Jeffrey MH-88 cable reel locomotive.
G. E. 150 KW converters complete with switchboards and transformers.
G.E. 100 KW. converter complete with switchboards and transformers.
Jeffrey 6' Aerovane fan.
Goodman shortwalls.
Robins vibrators.
Jeffrey 6-A drills.

Bank cars, Joy parts, loading booms, belt conveyors, feeders and other items too numerous to mention.

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Grandview Mine Resumes Operations

Recently operations were resumed at the Grandview mine of the American Zinc, Lead & Smelting Co. at Metaline Falls, Wash., following a strike which had been in effect since July 1, 1948. Plans call for increasing production to approximately 800 tons per day as a result of improvements made during the 14 months' strike.

During the strike the main shaft was sunk an additional 700 ft, the crushing department and the mill were completely remodeled and new equipment installed. A third compressor was placed in readiness for use and a new mine office and change house were constructed.

Plan Magnesite Plant

Construction of a plant for the manufacture of finished magnesite products is under way in the Gabbs district of Nevada by Standard Slag Co. of Youngstown, Ohio. Housed in a steel fabricated building, 80 by 200 ft in dimension, the plant is expected to be in operation by September. Ore will be hauled to the plant from a nearby quarry by trucks. Daily production will be 50 tons of finished magnesite products for use in steel and other metal industries. Six cars are shipped daily to San Francisco for transportation to Japan. The company purchased large brucite and magnesite deposits in the Gabbs area last year from United States Brucite Corp.

Book Review

MINE PLANT DESIGN, *by W. W. Staley, Professor of Mining, University of Idaho, McGraw-Hill Book Co., Inc., New York, 1949. $7.00. 540 p.*

PRACTICAL methods and procedures for designing and selecting mine plant equipment are discussed in their relation to meeting specific conditions. The subjects covered include headframes, ore bins, skips and cages, mine hoists, mine haulage, power plant, mine ventilation and other topics pertinent to mining construction.

Stress diagrams and other illustrations cover the various subjects in adequate detail. Sample problems of the topic discussed are solved in order that the reader may thoroughly understand the approach to a given problem. References provide a source of additional information on specialized topics.

This second edition of a useful text has been brought up to date in the light of advances which have been made since 1936. Many of the chapters have been completely rewritten and several new chapters have been added.

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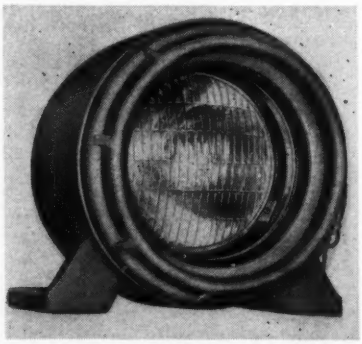
Manufacturers Forum

Locomotive Headlights

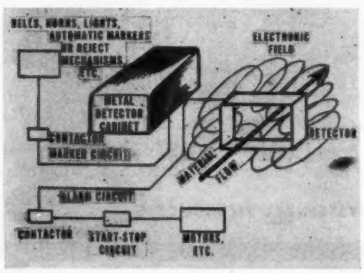
An intense light beam over 500 ft long is claimed for a new sealed-beam locomotive headlight, the "Locolite," recently introduced by National Mine



Service Co. A resilient, spring-type mounting supports the sealed-beam lamp, protecting the filament from vibration. The case is made of heavy cast iron and the lens is pyrex heat-resistant glass. As the reflector bulb is sealed within the headlight, foreign matter cannot enter. The Bemeco "Locolite" is made in two types—permissible Type P and non-permissible Type NP.

Electronic Metal Detector

An electronic metal detector, developed especially for processors of rock coal products, will detect both



ferrous and nonferrous tramp metal. It is said to be particularly adaptable for installation on conveyor belts running at speeds ranging up to 900 fpm.

In operation an electro-magnetic field is placed completely around a section of the belt conveyor. The detector automatically stops the belt if a foreign metal is present. Complete information may be obtained from the Eriez Manufacturing Co., Erie, Pa.

New Cast Iron

A new cast iron which is not brittle, but which may be bent or twisted is now available to industry. Popularly known as ductile cast iron, the new product has several times greater strength than ordinary cast iron with greatly increased ductility and shock-resistance. Patents on this new industrial material have been granted to the International Nickel Co.

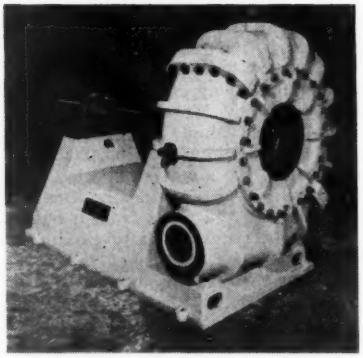
Many of the advantages of steel, such as fluidity, castability and machinability are possessed by this new material. Under stress, it behaves elastically like steel rather than like cast iron. The essence of the production of the new material is the introduction into and retention by the molten iron under treatment, of a small but effective amount of magnesium which produces a new graphitic structure in the form of spheroids or compacted particles.

Mammoth Trailer

A 300-ton capacity trailer was recently built by the Eidal Manufacturing Co., Albuquerque, N. M. General Electric welding equipment was used to fabricate the trailer which is designed for moving rotary oil-drilling rigs and draw-works without disassembling. The original method of moving rigs required approximately 30 days, but use of the 72,000-lb trailer will enable making the move in about 24 hr.

Solids-Handling Pump

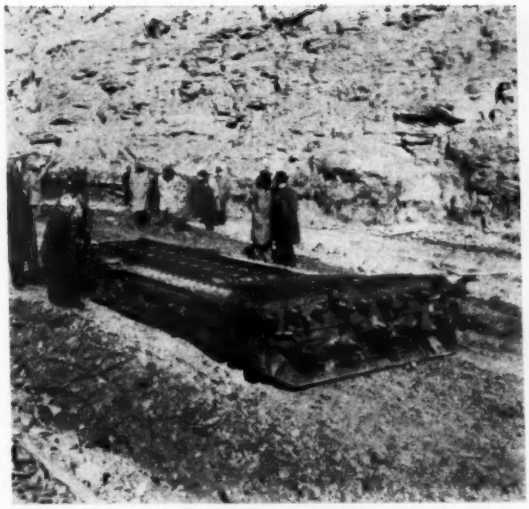
For use in mine operations, Thomas Foundries, Inc., Birmingham, Ala.,



has introduced a pump constructed of Thomas Ni-Hard, an extremely abrasion-resistant metal. Sustained pumping efficiency and extremely long life are said to be outstanding features of this new pump.

Plastic Cable Splice

A durable water-tight electrical seal, is said to be obtained in short time by use of a plastic cable splice developed by the United States Rubber Co. The main structural part of the new splice is a pipe made from a tough, corrosion-proof blend of synthetic rubber and thermoplastic res-



Low model will operate in 32-in. coal

Coarse coal feeds off conveyor into shuttle car

Low-Type Colmol Demonstrated

ON November 2, the Colmol Corp., a joint organization of the Jeffrey Mfg. Co. and the Sunnyhill Coal Co., demonstrated the operation of a new low-type Colmol. The demonstration was held in the Sunnyhill pit near New Lexington, Ohio, where the machine was cutting coal in a seam about 34 in. high.

The length of the new machine is 23 ft and it weighs 23 tons. The breaker head has a width of 9 ft 6 in. and a vertical breaking range of 31½-41 in. Body height of the machine is 28⅝ in. and width at the controls is 6 ft 6 in., thereby providing adequate clearance and sufficient room for the operator. In operation, the Colmol has a working speed of 0-8 fpm and a tramming speed ranging up to 25 fpm. The 45 in. conveyor has an adjustable tail elevation with a maximum elevation of 46 in.

Two gear cases drive breaker arms located on two breaker heads. The upper breaker head has ten arms with an 8½-in. radius and the lower breaker head has five arms with a 14-in. radius. These breaker arms operate at a speed of 60 rpm.

The entire unit operates on treads 11 in. wide with approximately 9 ft of the tread bearing on the bottom.

Two hydraulic pump systems are used to operate the Colmol; one closed system powers the breaker heads and an open system provides traction, runs the discharge conveyor, tilts and elevates breaker heads and drives a super-charging pump for the closed system.

The entire machine may be raised six inches for scraping the bottom by means of four hydraulic jacks. At full forward tilt the breaker arms can cut three inches below the blade. Likewise the breaker heads can be tilted upwards to give the breaker arms flexibility in an undulating seam of coal.

Test runs with the unit demonstrated at New Lexington have achieved an advance rate of 30 in. per minute and better. Coal has been produced at the rate of 3 tons per minute.

The company plans to build three of the low-type Colmol and three medium-type machines at an early date. The unit tested at New Lexington was built for the Ben Hur Coal Co. for use in its operations at Henrietta, Okla.

---

ins. This fits over the cable joint and two rubber seals are used in the pipe to make a moisture-tight seal. Threaded plastic caps on each end of the pipe grip the cable to finish the joint. This type of splice housing is recommended for underground installations on either rubber or neoprene cable and experiments are under way to determine its serviceability on lead jacketed cables.

Coal Research Laboratory

Construction has been started by McNally Pittsburg Mfg. Corp., Pittsburg, Kan., of a new coal research laboratory building. The new building, scheduled for completion in November, will permit extension of the research phase of coal preparation and enable long-range studies to be maintained on a continuous basis with commercial size equipment.

— *Announcements* —

Tench G. Swartz has been appointed field engineer for the **Denver Equipment Co.** in the state of Arizona and parts of northern Mexico.

C. J. Moore has been appointed manager of Exide's railway and motive power sales division of the **Electrict Storage Battery Co.**

D. E. Norquist has been appointed manager of grinding media sales for **Sheffield Steel Corp.**

W. H. Summers operating as **The W. H. Summers Co.**, has taken over the distribution of **Boston Woven Hose & Rubber Co.** mechanical rubber goods in the Cleveland area. Mr. Summers was formerly district manager in the Cleveland area for Goodyear Tire & Rubber Co.

Eugene O'Connell has been appointed manager of the San Francisco branch of the **Independent Pneumatic Tool Co. Clarence H. Gabriel**, formerly service engineer at the Salt Lake branch, is the new manager at Denver.

Otto von Perbandt has joined the staff of **Nelson L. Davis Co.** as contracting engineer in charge of estimating.

John A. Roebling's Sons Co. has opened a new office and warehouse in Denver, Colo. **Homer H. Davis** will serve as manager, with **Roy H. Hainsworth** acting as assistant manager.

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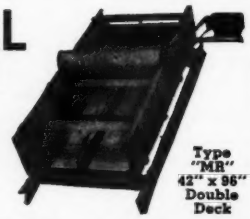

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